FLIGHT

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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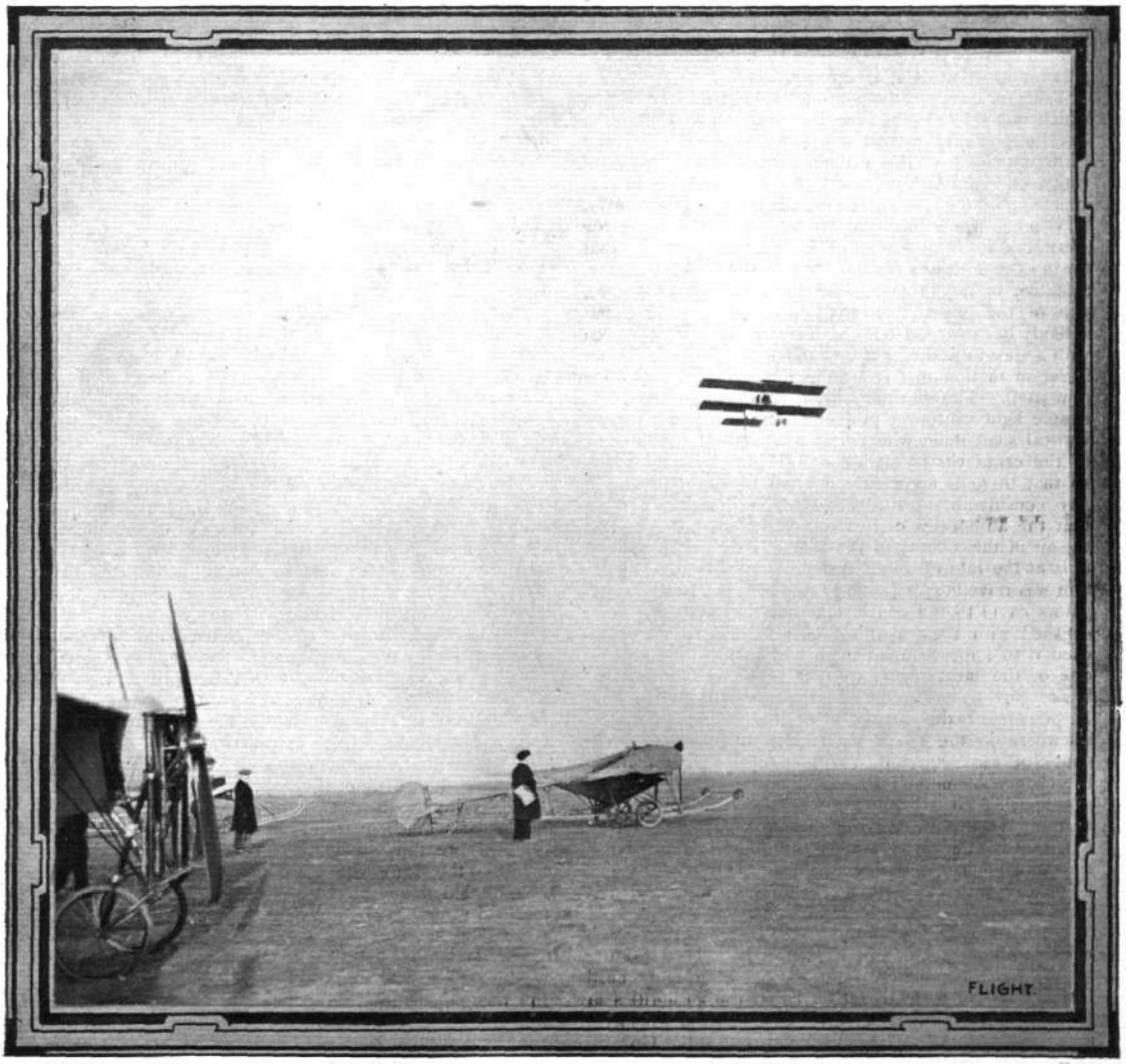


A PASSENGER FLIGHT AT BROOKLANDS.—Lieut. Watkins, with a passenger, on Mr. Maitland's Howard Wright biplane, making one of his graceful flights past the hangars. At temporary rest is the Weiss monoplane.

NATIONAL RESEARCH IN 1910.

THE Report of the National Physical Laboratory for the year 1910 was presented to the General Board of that Institution on Friday last, and so much of it as relates to aeronautics we publish practically in extenso elsewhere in this issue. In reviewing the work carried out during the period in question it is very necessary to bear in mind that aeronautics forms one and not necessarily the largest of several departments of this rapidly expanding and urgently needed institution. It is true that to an extent the activity of each section depends more or less directly on the funds earmarked for their use, but in experimental work it is never otherwise than disastrous to pursue the methods of the jerry-builder in the erection of either buildings or plant. Nothing is perhaps quite so incomprehensible to the lay mind as the time that it takes to get to work along any line of experimental research. And, it is seemingly just when everything is in readiness for the real business to commence that the greatest apparent delay intervenes.

Take, for example, the whirling table at Bushey House, which was erected this time last year. The Institution has undoubtedly carried out some very valuable tests with propellers on this machine, many of the results of which will, we hope, be available for publication in due course. None know better than the authorities, however, how much time has had to be spent on testing the apparatus itself in order to be perfectly certain that the apparent results obtained are really and fully representative of the propellers in question. For instance, one of the most interesting investigations that has recently been carried out on this very machine has been with a view to finding out how much the air in the room is set in motion merely by the rotation of the whirling arm itself. The whirling arm, it may be remarked, is a simple light cantilever projecting radially from a central vertical shaft upon which it is rotated, and the bracing of the cantilever is mainly carried out by steel wires, so that there is apparently not much reason to expect any considerable disturbance. The first experiments that the authorities carried out indicated, however, that the air in the vicinity of the arm was dragged round in bulk at the rate of about two miles per hour when the arm was travelling at about 35 m.p.h. Then the investigators came to the conclusion that they were not quite satisfied with their methods of research, so they proceeded to improve upon them and incidentally evolved one of the most ingenious methods for doing so that has recently been introduced into this sort of undertaking. Particulars of the theory associated therewith appear elsewhere in the report itself, and will well repay the study of those scientifically inclined. The result of the change of method was to alter the estimated speed of the whirl to 1·5 m.p.h., which velocity represents, so to speak, the "wake" of the ship. We explain thus lengthily a little matter that in some respects may be of no consequence to the general reader in order to give an inkling into the workings of an institution which is unquestionably of national importance.

We have had occasion to remark before that research work is an utter waste of time if it is not carried out by the right men in the right way; and nobody need feel other than perfectly satisfied that the authorities at Bushey House are essentially qualified in all respects for this sort of undertaking. Like in most other Government Departments money is lacking wherewith to give full effect to all that might be done; but this last year the finances of the aeronautical section have been improved, and considerable headway has been made. This is so especially in the matter of tests and research that have been of immediate value to the Government Balloon Factory, though some of these results must, in the natural order of things, be kept secret, at any rate for the time being.

Incidentally it may also be mentioned that the National Physical Laboratory is growing tremendously in its other departments, and it is a matter of very general public interest to know that there is now available a fine large tank wherein model ships can be tested for resistance to wave making.

Tests continue to be conducted on the strength and general utility of balloon fabrics, and special attention is just now being devoted to the behaviour of fabrics under ultra-violet light. The effect of punctures has also received attention, and in general it has been shown that the damage to the fabric is proportional to the size of the hole and independent of the size of the sheet in which the hole is made, provided always that the sheet in question is larger than what is called the danger area, which is defined as having dimensions ten times the diameter of the puncture. Fabric bags inflated to any required pressure are being tested under tensional strain; and the effect of temperature on the leakage of hydrogen.

Finally we would revert once more to the subject to the N.P.L. as a national institution, because the evidences of its growth during the past year are such as to lead one to believe that in a comparatively short time it will have expanded beyond recognition, provided that the necessary support is forthcoming for its proper maintenance. Very expensive to keep up is an institution of this character; but in these days, when science is the backbone of commerce, and scientific facts are the counters of everyday business, it behoves Great Britain as a nation to take full advantage of this means of keeping abreast of the times. The National Physical Laboratory is primarily a Government affair; but it is also there for the purpose of conducting experimental work for firms and individuals who, on the whole, pay less for such assistance than the Government pays for what it derives from the establishment. Those whose business it is, therefore, to design or construct things about which they have inadequate information should not hesitate to approach the N.P.L. with a view to obtaining assistance. One of the great advantages of an institution of this character is that the officials associated therewith include experts in practically all branches of science, so that, although the aeronautical department is technically a distinct division, it is supervised by men who can bring to bear a very useful all-round experience to the furtherance of its efficient working. Moreover—and this we think may interest some of our younger readers—the Imperial College of Science and Technology, aided by the Women's Aerial League, have founded three scholarships in aeronautics, and the official report states that these scholars are now carrying out researches at the laboratory, and form a valuable addition to the staff. This is most excellent encouragement for the rising generation to get a proper footing on the scientific side of the movement, and we hope that this good work will not only continue to receive encouragement but may in due course have a still wider sphere of operation.

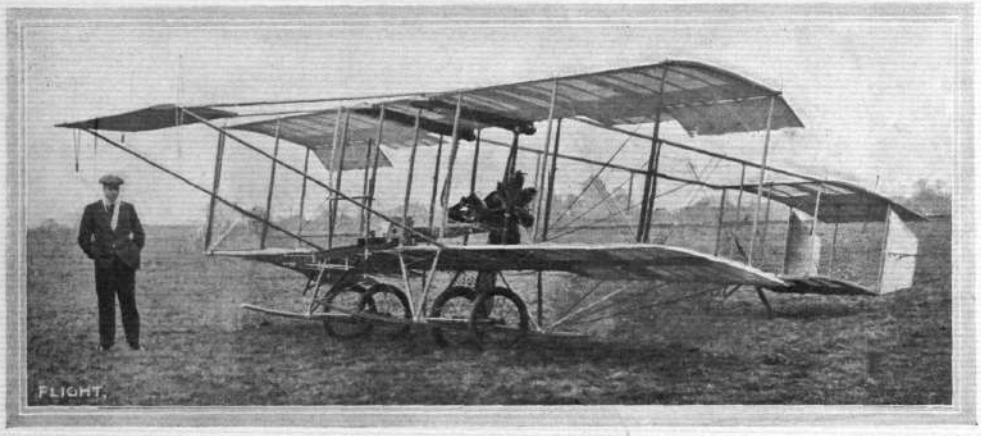
FLIGHT PIONEERS.

MR. H. J. D. ASTLEY.

THE GRAHAME-WHITE BIPLANE.

THE "NEW BABY" TYPE.

ALTHOUGH belonging to a very conventional type—the Farman—the latest Grahame-White biplane is full of interesting constructional details that well repay a close study on the part of those who are concerned in the aeroplane development of the day. So soon as any one particular type becomes popular because of its extended success, progress is necessarily confined more or less to minor features, and a basis of their own design, because for one thing it is a line along which they are assured of success; and secondly, which is equally important, the popularity of the type itself is more or less a guarantee of some measure of commercial prosperity as a reward for such labours. Notwithstanding the fact that there are so many machines on the market of the Farman type, however, each one of those that we have



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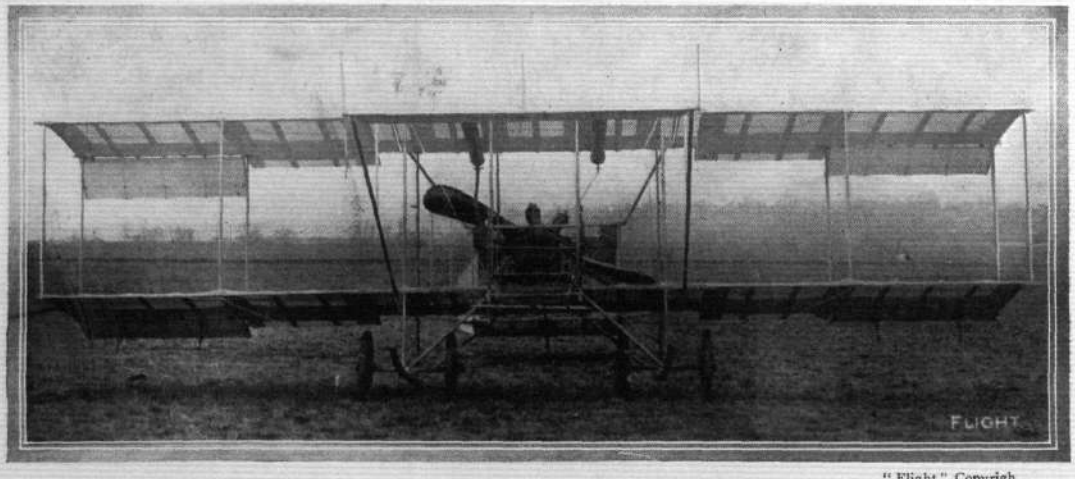
Mr. Grahame-White and his "New Baby" biplane.

in this way detail design and workmanship steadily improves, and a fund of useful experience is gradually built up to enhance the chances of success with any new model that may be ultimately evolved. Most of the high-class machinery of the present day is useful only because it is well made, and the excellence of engineering workmanship nowadays is not only a matter of relative superiority as between one machine and another, but is absolutely a fundamental necessity to the success of the type as such. The internal-combustion engine, for example, would be a complete failure but for the fact that it is well made, and thus it is that there is a distinct interest attaching to an investigation of a number of aeroplanes of the same type. At the present time the Farman biplane represents a type of machine that is most popular. Many manufacturers very wisely adopted it as illustrated in FLIGHT has had some detail or other that has been worthy of the attention of our readers, and the present machine is no exception. Its broad feature of interest is its small size, for the span is only 27 ft., and the overall length only 32 ft. 3 ins. It is intended for a light, fast flyer, and it has been beautifully built throughout. Most of the timber is silver spruce, with the exception of the central struts and the under-carriage, which are made of ash. It will be noticed, too, that the under-carriage does not extend very far below the main planes, consequently the machine as a whole is not very high; indeed, when standing on the ground it is only 8 ft. 6 ins. to the edge of the upper main plane.



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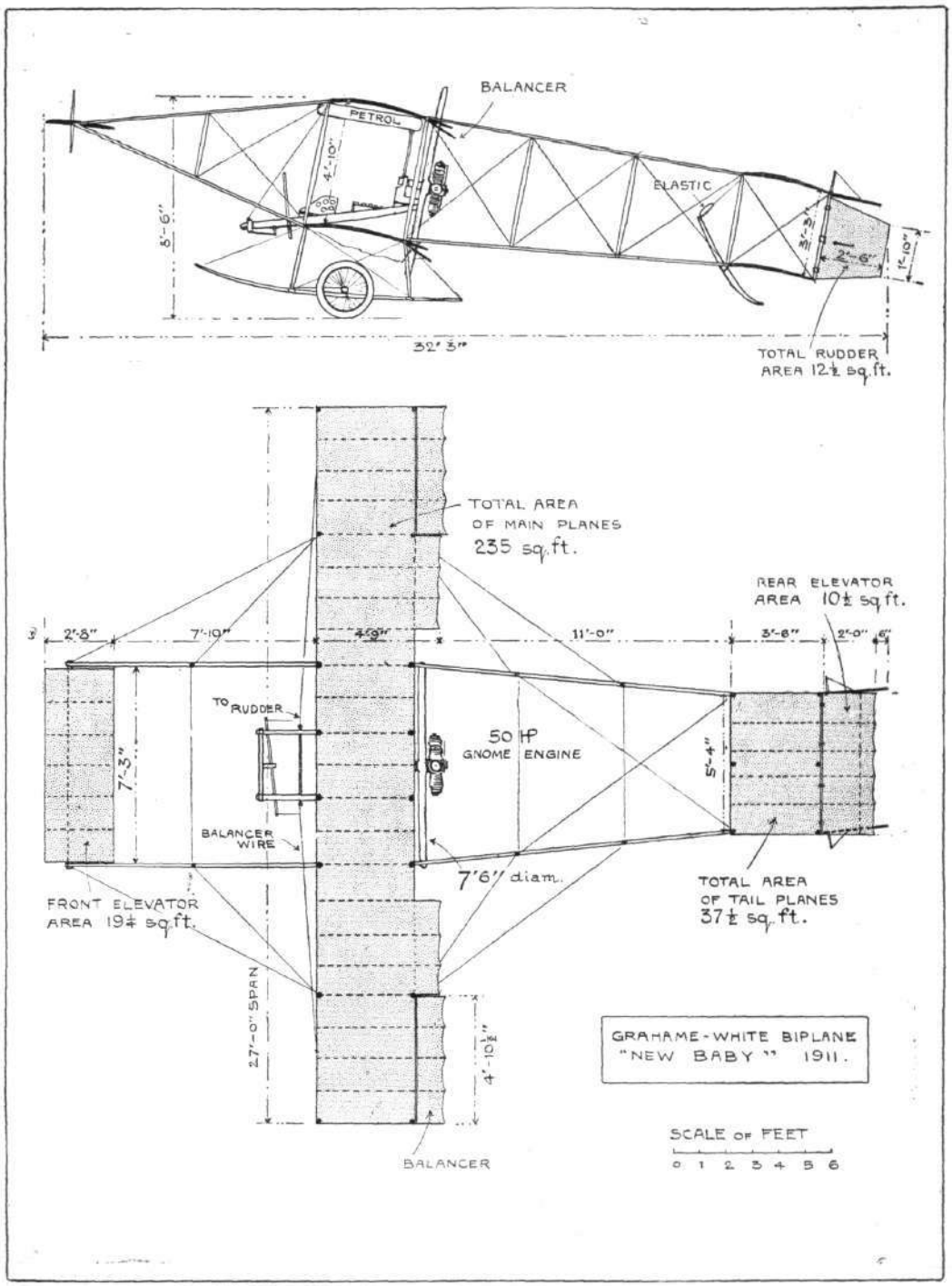
Front view of the Grahame-White "New Baby" biplane.

In order to allow the propeller to clear the ground, too, it has been necessary to raise the engine, which now



GRAHAME-WHITE "NEW BABY" BIPLANE.—*Plan and elevation.*

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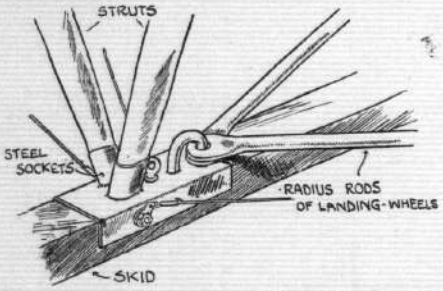
Rear view of the Grahame-White "New Baby" biplane.

occupies a position midway in the gap. A very neat sloping frame supports the engine and the pilot's seat.

Among constructional details, the most interesting feature of this Grahame-White biplane is the use of steel fittings throughout, instead of the aluminium sockets and lugs that are commonly employed in aeroplane construction. Some examples of these steel fittings are illustrated in the accompanying sketches; and one that is of particular interest,



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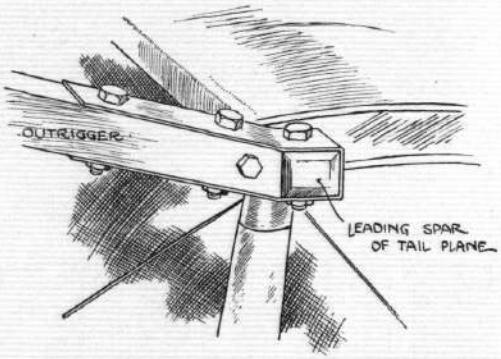
Sketch illustrating one of the steel sockets which are such a characteristic feature of the Grahame-White "New Baby" biplane.

inasmuch as it is called upon to withstand very severe shocks, is that forming the sockets that carry the struts supporting the machine upon the skids. The sketch itself gives a very good idea of the neatness and lightness which is so characteristic of the actual appearance of these details on the machine itself. Another place in which a steel bracket is used is for the attachment of the leading spar of the tail plane to the outrigger, and this also is shown in one of the illustrations. The method of hinging the rudder plane to the tail strut is likewise shown in detail in a similar manner, as also



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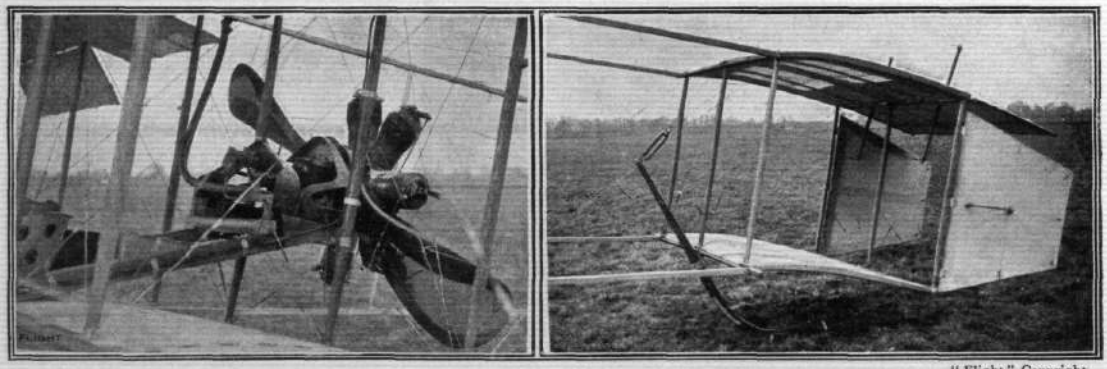
Sketch illustrating the attachment of the tail to the outrigger by means of steel sockets on the Grahame-White "New Baby" biplane.

is the safety wiring by means of which the guy-wires in the vicinity of the propeller are prevented from fouling the propeller blades should one of them accidentally break. Experience has taught that some precaution of this sort is eminently desirable, not because breakages are frequent but because the consequences of one are so very unpleasant



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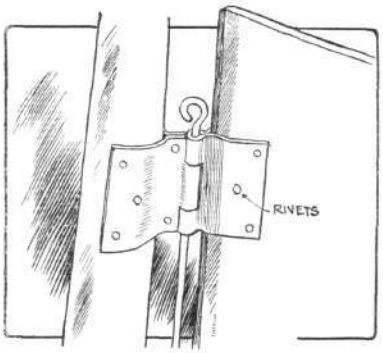
Views of the engine and the tail on the Grahame-White "New Baby" biplane.

if the wire gets tangled up in the propeller. Moreover, the propeller is not the least expensive part of the machine, and there is also the engine to be considered. On one occasion on which we witnessed a rather indifferent landing with a standard type Farman biplane we recollect noticing that one of the guy-wires had in some extraordinary way been jerked under the rock-lever operating the exhaust valve on one of the cylinders of the Gnome engine, and it is to guard against consequences of this sort that these simple precautions are taken by experienced constructors, and are, therefore, of general interest, although apparently of such a minor character. The system of control on the Grahame-White model is the standard system, but the arrangement of the control-lever is uncommon and interesting. The lever is duplicated so that one lever is fitted on the left and another on the right of the pilot's seat. These levers are coupled together by a cross-bar, which can be hinged out of the way whilst the pilot is mounting to his seat. In flight the pilot has the cross-bar immediately in front of him, and can thus use either or both hands in the control; the movements themselves, however, are of course of the usual kind, and the cross-bar, being pivoted at both ends, interferes no more with the sideways balancing movement than it does with the to-and-fro operation of the elevator. In connection with this detail, again, the use of steel sockets constitutes a prominent feature, and although the design has incorporated an additional member, nevertheless the characteristic lightness and neatness in appearance has been retained.



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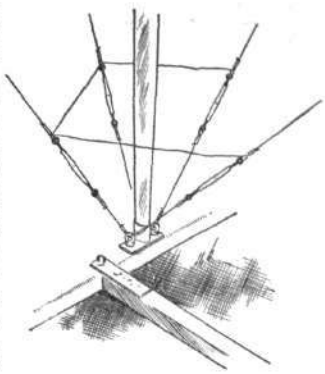
Sketch illustrating the steel rudder hinge on the Grahame-White "New Baby" biplane.



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Sketch illustrating how some of the guy-wires in the vicinity of the propeller are anchored to one another for safety, in case either breaks, on the Grahame-White "New Baby" biplane.

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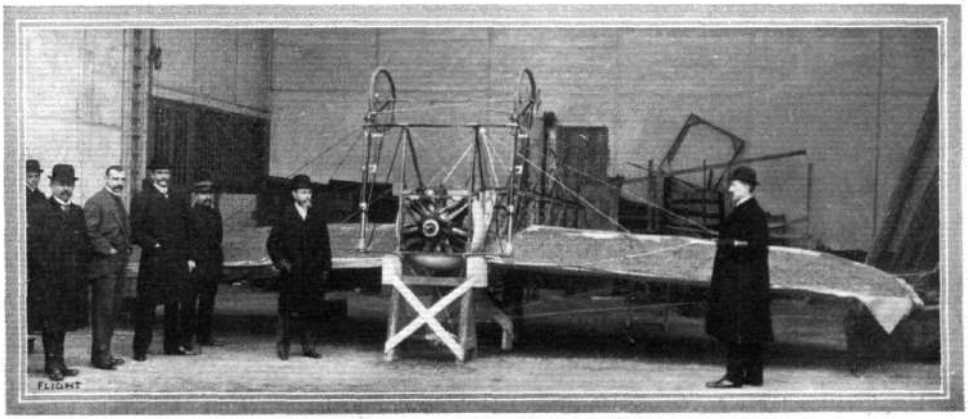
OLYMPIA SHOW, 1911.

LIST OF AEROPLANE AND AERO ACCESSORY EXHIBITORS.

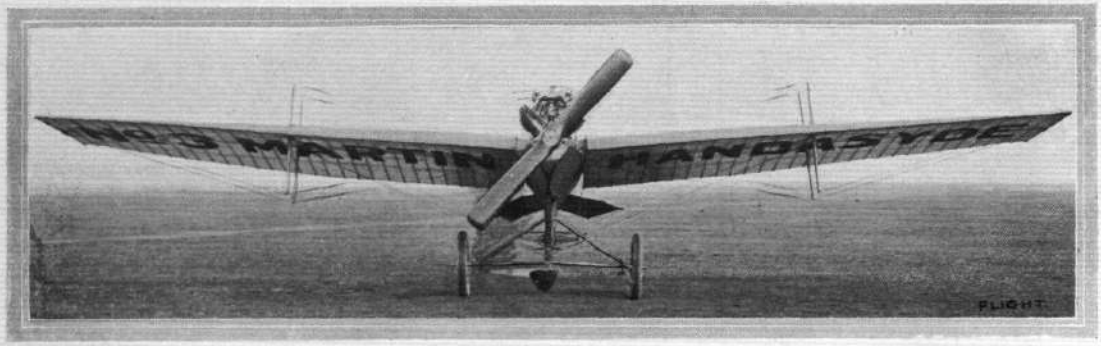
The figures after the names denote the Stand No.

A.A. and M.U., 9
Aerial Engineering Works, 3
Aeronautical Society of G.B., 21
Aeronautical Synd., Ltd., 69
"Aeronautics," 16
Aeroplane Supply Co., 2, 77
All-British Engine Co., 10
Allen Knight & Co., Ltd., 33
Almagam, 37
Basset-Lowke & Co., 5
Blackburn Aeroplane Co., 45
Blair-Atholl Aeroplane Synd., Ltd., 81
Blériot, L., 43
Bowley and Sons, 88
Breguet, L., 76
British & Colonial Aeroplane Co., 47
Brown Brothers, Ltd., 18
Burroughes, Wellcome & Co., 7
Car & General Insurance Corp., 27
Clarke, T. W. K., & Co., 17
Cole, W., & Co., 74
Ding, Sayers & Co., 6
Ducrocq, Maurice, 80
Dunlop Rubber Co., 56
Dunne Aeroplane, 81
FLIGHT, 1
General Aviation Contract Co., 19
Goodchild, G. W., 32
Grahame-White, C., & Co., Ltd., 14, 42
Green's Motor Pats. Synd., Ltd., 31
Handley Page, Ltd., 73
Harris and Samuels, 34
Hayes, F., 11
Howard Wright, 68
Hughes, Henry, & Co.
Humber, Ltd., 44
Imperial Motor Ind., Ltd., 15
Isaacson Radial Engine Co., 22
Knight, A., & Co., 33
Lamplough & Sons, 28
Leo Ripault & Co., 36
Mallinson & Son, 4
McLean, McLean & Co., 13
Melhuish, Richard, 41
Motor Boats, 48 to 64
Motor Radiator Mfg. Co., 8
Mossley Hill Motor Works, 12
Mulliner, Ltd., Long Acre, 46
New Engine Co., Ltd., 65
New Motor & General Rubber Co., 37
North British Rubber Co., Ltd., 26
Piggott Brothers, 71
Polysulphin Co., Ltd., 72
Renault Frères, 39
Ripault, Leo, & Co., 36
Roe, A. V., & Co., 29
Royal Aero Club, 82 to 86
Rubery Owen & Co., 40
Sanders Biplane, 75
Simms Magneto Co., Ltd., 38
Smith, S., & Son, 98
Spencer & Son, 25
Spiral Tube & Components Ltd., 30
Stern, Sonneborn & Co., 35
Trier & Martin, 70
Valkyrie Aeroplane, 69
Warwick Wright, Ltd., 68
Weston, Hurlin & Co., 24
Wolseley Tool & Motor Co., 51



TESTING THE WINGS OF A BLÉRIOT MONOPLANE WITH SAND LOAD.—Standing on the left are Mr. Grahame-White, M. Blériot, Col. Bouttleaux, General Roques, &c.

THE MARTIN-HANDASYDE MONOPLANE.



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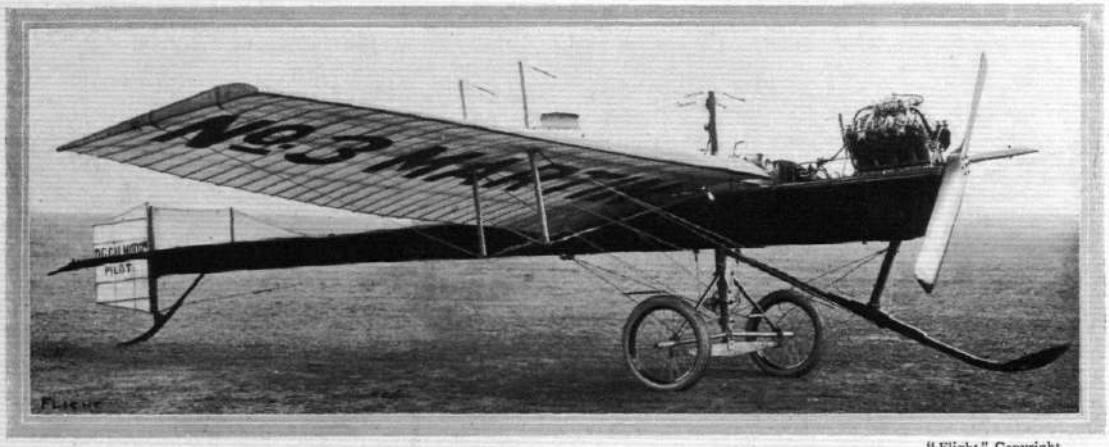
General view from in front of the Martin-Handasyde monoplane, No. 3, showing the forward bracing of the wings to the skid.

ANYONE first glancing at the Martin-Handasyde monoplane No. 3, or at the accompanying illustrations thereof, might be pardoned for supposing it to be an Antoinette; no intelligent observer familiar with the details of the Antoinette machine, however, could possibly fail to regard the Martin-Handasyde as anything but an original design after a few moments' thought. Where, to take only the popular aspect of the case, are those hand-wheels outside the body that pilots of the Antoinette monoplane manipulate so dexterously in windy weather? Then again, this is a much smaller machine and it is supported on an under-carriage quite like the Antoinette at a distance, but totally dissimilar in detail



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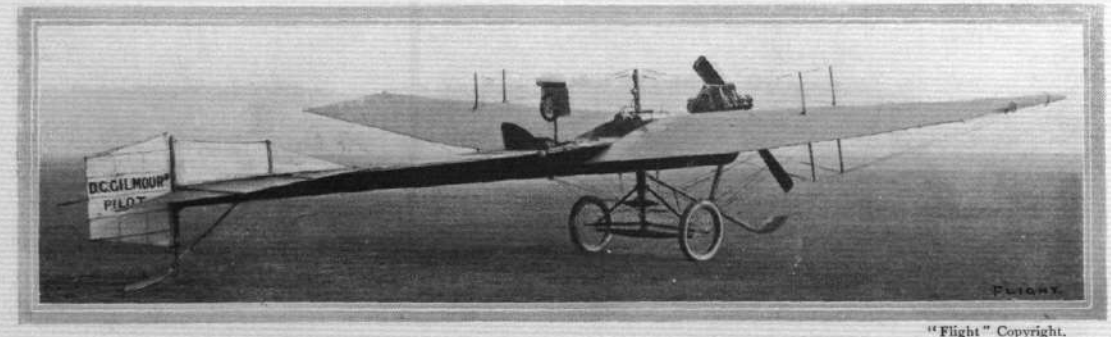
Side view of the Martin-Handasyde monoplane, No. 3.



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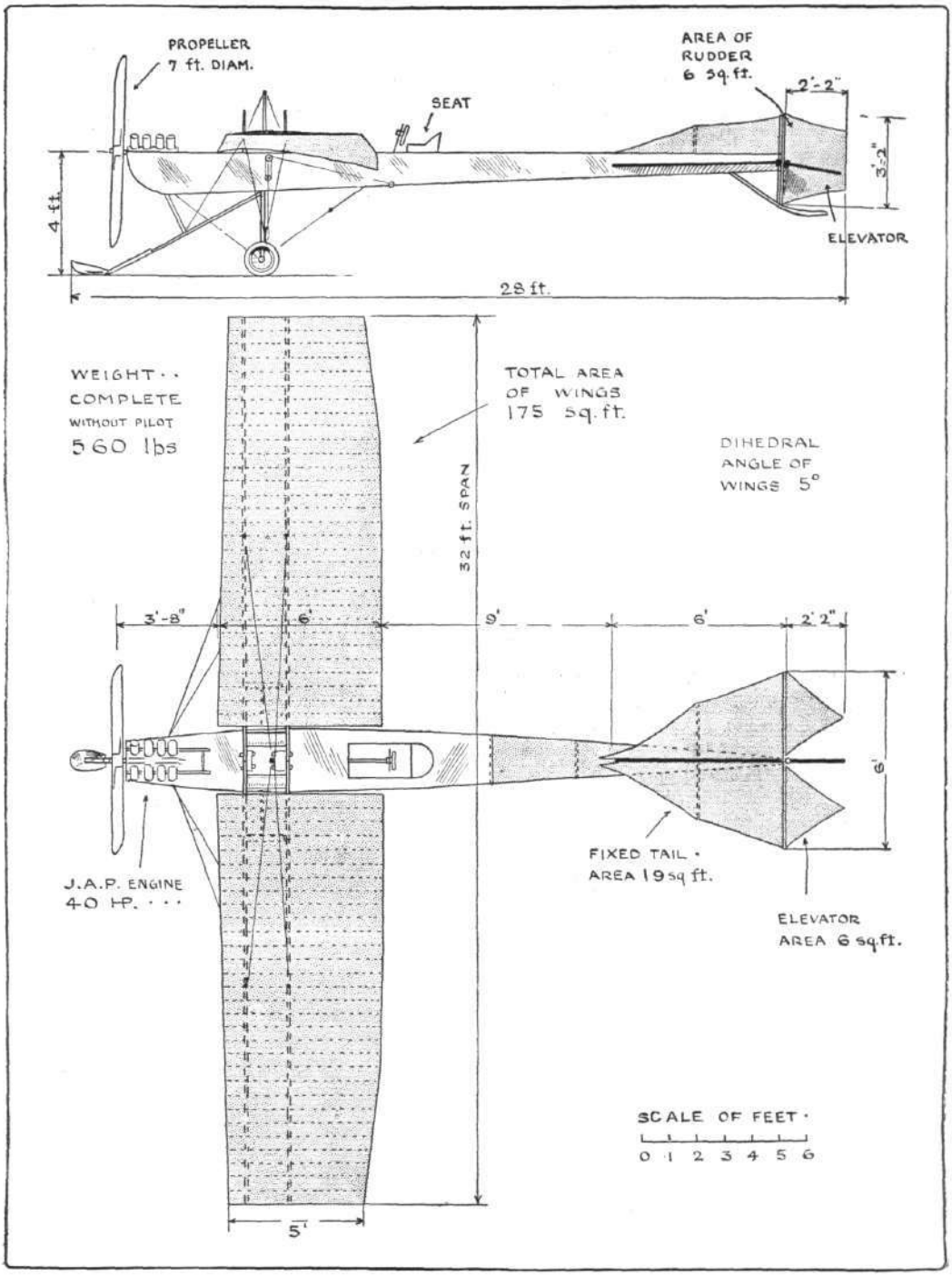
General view of the Martin-Handasyde monoplane from behind, showing the bracing of the wings. The plate in front of the control-wheel is a shield to protect the pilot from the oil that is thrown out by the engine.



MARTIN-HANDASYDE MONOPLANE, No. 3.—Plan and elevation to scale.

when examined at close quarters. Moreover, not only is the machine supported on this under-carriage, but it balances about the axle when the pilot is not on board. The engine is situated rather far forward and the propeller is, as a matter of fact, 3 ft. 8 ins. from the front edge of the planes. The weight of the engine has therefore sufficient leverage to balance the weight of the tail. Taken on its broad lines, however, it is presumably correct to say of the Martin Handasyde monoplane that it belongs to the Antoinette type.

It has a boat-like body covered with wood, and in the bows thereof is mounted the 40-h.p. Jap engine with which the machine is at present equipped. Direct-coupled to the crank-shaft is a 7 ft. two-bladed propeller, which is protected against damage in rough landing by a skid jutting out from beneath the body and provided with a spoonlike foot. This skid, although strong, is flexible and bends noticeably when it comes in contact with the ground. Its spoon-shaped foot is formed by a sheet of steel hammered into shape and fastened to the end of the skid as shown in an accompanying sketch. The under-carriage itself, which this skid adjoins where it springs from the body, is of particular interest on account of the use of a divided tubular steel axle, reinforced and suspended by a laminated leaf-spring of lancewood. The constructional details of this interesting feature are well illustrated by an accompanying sketch, where it will be observed that each wheel is mounted on a half-axle hinged at its inner end to the lower extremity of the central mast that forms the principal upright of the machine. Bridging this joint is the laminated construction of lancewood that forms the principal member of the suspension. At the centre it rests in a channel bracket and its extremities engage with shackles that are hinged to the axle. Thus mounted, each wheel is free to rise and fall independently, for it will be observed that the diagonal strut, which forms a subsidiary member in the bracing, is telescopic; incidentally it is fitted with a rubber cushion inside the tube, which comes into action in emergency. Equally ingenious is the bracing of the axle fore and aft by wires that are linked together with a tension spring so arranged as to automatically keep them taut. This detail is likewise illustrated in the same sketch.

Above the body of the machine at this point, the mast carries the guy wires to the front and rear spars of the wings, and as the rear spars are hinged to the frame to facilitate warping, their guy wires are supported on a pulley so as to automatically adjust themselves to the warping movement. The operation of wing warping is effected by turning a steering-wheel mounted on an axis at right angles to that of an inclined column situated immediately in front of the pilot's seat. On the wheel-spindle is a small drum, round which is the warping wire leading to a pivoted cross-beam mounted on the central mast below the body. In order to increase the leverage, a block and tackle gear has been ingeniously introduced into the cable, as shown in an accompanying sketch. Fixed to the pivoted cross-bar is a chain-wheel engaging with which is a chain that has its extremities fastened to the wires leading to the rear spars of the wings. There is, of course, a very considerable tension on these wing-warping wires and consequently no tendency for the chain to fall off the wheel, but a light guard, not shown in the sketch, is fitted in practice.

Moving the steering-wheel and the column on which it is

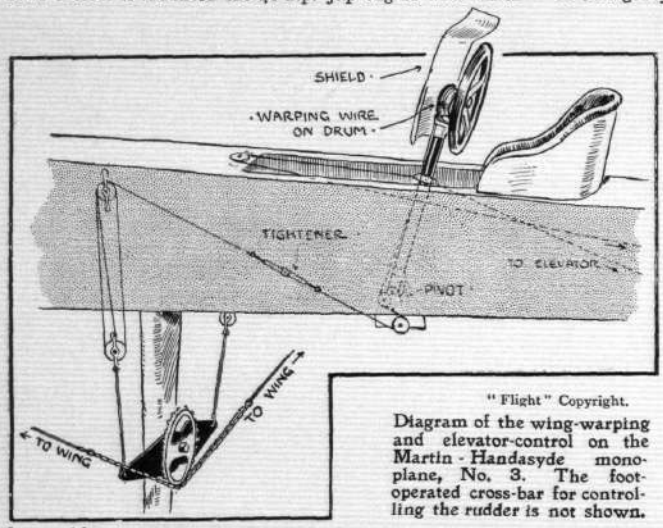


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Diagram of the wing-warping and elevator-control on the Martin-Handasyde monoplane, No. 3. The foot-operated cross-bar for controlling the rudder is not shown.

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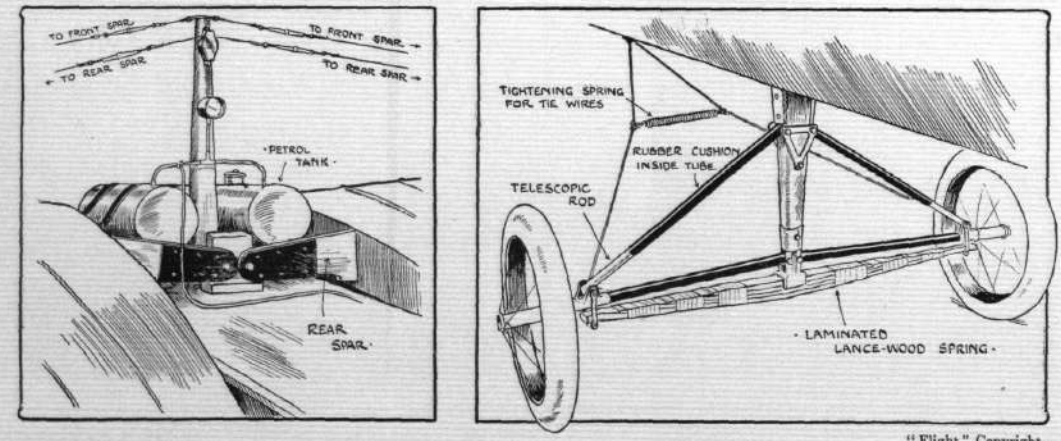
Sketch of the spoon foot on the skid of the Martin-Handasyde monoplane, No. 3.



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Sketches illustrating the attachment of the wings to the body, and the details of the undercarriage supporting the body of the Martin-Handasyde monoplane, No. 3.

mounted bodily to and fro operates the elevator, which is formed by two triangular flap extensions of the fixed horizontal tail-plane. The triangular shape of these planes gives room for the free movement of a rudder-plane mounted vertically between them, and, like the elevator, forming an extension of a fixed tail-plane. The rudder is operated by foot through the agency of a pivoted bar.

Of the wings themselves, it is interesting to remark that they each weigh 70 lbs. complete and are very strongly constructed, in spite of the fact that the spars by which they are attached to the body have the appearance of being very light. Inside the wings themselves, however, these spars are of ⊢ section, 2½ ins. in width and 7 ins. in depth. In addition to their top and bottom guy wires, the wings are also stayed by wires leading forwards to the projecting skid. The camber of the wings varies from the shoulder to the tip, the chord having a positive angle of incidence of about 5° adjacent to the body and being horizontal at the outer extremities. The thickness of the plane at the shoulder is 8 ins., but diminishes 2½ ins. at the extremities and the chord itself also diminishes from 6 ft. to 5 ft., although this latter change is brought about more or less abruptly by obliquely cutting away the trailing edge from a point about 5 ft. from the extremities.

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NATIONAL PHYSICAL LABORATORY REPORT FOR 1910.

A GENERAL description of the equipment provided for aeronautical research was given in the report for 1909.* During 1910 considerable additions have been made, chiefly to the motor-testing plant, of which details are given below.

The following researches have been carried out during the year :—

1. **Experimental Wind Channel.**—(*a*) Determination of the various positions of the centre of pressure on a curved airship rudder corresponding to different inclinations.

(*b*) Determination of the curves of lift and drift of four model sets of lifting planes for a dirigible.

(*c*) Measurement of the horizontal and vertical components of the wind pressure on eleven model balloon sheds.

(*d*) Determination of the resistance of thin wires in a current of air (1) when steady (2) when vibrating at high frequencies.

(*e*) Determination of the air resistance of radiators of honeycomb section.

2. **Experimental Water Channel.**—(*a*) Determination of the total resistance of a large number of model dirigibles.

(*b*) Experiments on the lift and drift of a model dirigible at various inclinations to the current and determination of the line of action of the resultant force.

(*c*) Experiments on the stabilising action of fins of varying areas on a model dirigible.

3. **Whirling Table.**—The calibration of the dynamometer for corrections due to air pressure and friction has been completed and the following tests have been made :—

Complete tests of three Ratmanoff model propellers for the balloon factory.

Test of model propeller for a private firm.

Tests of five model propellers for the Admiralty.

Determination of the amount of the Air Swirl in the Neighbourhood of the Whirling Arm.—In addition to the work already referred to, a careful investigation has been made of the extent to which the air in the whirling table shed is set in motion by the whirling arm. The velocity of this air current was originally estimated, by means of a Pitot tube, as about 2 miles per hour when the end of the arm was travelling at 35 m.p.h., and it was considered necessary to measure the swirl velocity with an accuracy of 10 per cent. so as to give the velocity of the arm relative to the air correctly to ½ per cent. As no instruments capable of measuring speeds less than 1 m.p.h. directly were available, the method of observation had to be modified in consequence. A 6-in. Biram anemometer, kindly lent for the purpose by Messrs. Davis and Son, and found suitable for speeds above 1 m.p.h., was calibrated by fixing it to the arm and moving the arm slowly. For this purpose the air swirl was neglected, as the arm speed never exceeded 4 m.p.h.

The anemometer was then fixed to the floor, first above and then below the rotating arm, and readings taken. At a mean reading of 1 m.p.h. the instrument sometimes stopped completely. For the higher speeds this did not occur, and the reading errors were not great. It was found that the velocity at the same radius depended on the position of the anemometer in the room, and finally readings were taken at eight points in the half circle and a mean obtained. This gave a swirl velocity of 2·1 m.p.h., and the swirl was very nearly proportional to the arm speed.

As a check on this, the anemometer was fixed to a pole and carried round the room in the direction opposite to that of the motion of the arm. The new series of values obtained in this way agreed very well with the previous determination.

It may be noted that the velocity measured in this way gives the mean velocity of the air swirl, whereas for a propeller the velocity required is that of the air into which the propeller is entering, this being somewhat lower than that determined. A series of observations was made to determine the retardation of velocity corresponding to a given swirl speed with the arm stopped. The correction found was small, and reduced the swirl velocity to 2·0 m.p.h. at 35 m.p.h.

A second method of determining the swirl velocity was then attempted. If a tube rotating about a point O has its outer end bent at right angles to its length so as to form a Pitot tube facing the direction of motion, and rotates so that the end moves with a velocity v, the pressure at O is that due to the velocity, v, *i.e.*, $\frac{1}{2}\rho v^2$, less the centrifugal head, which is also $\frac{1}{2}\rho v^2$, acting in the opposite direction. The change in density in calculating the centrifugal head amounts to 0·1 per cent. and is neglected. If, however, the velocity relative to the air is not v but V, then the velocity head is $\frac{1}{2}\rho V^2$, and the centrifugal head $\frac{1}{2}\rho v^2$, and the total pressure at O is $\frac{1}{2}\rho\,(V^2-v^2)$. If therefore the tube at O is connected to a gauge, the reading is a direct measure of the swirl, and in the gauge used a swirl of 2 m.p.h. at 35 m.p.h. would give a reading of about 100 divisions.

The rotating tube was one of the ordinary lead pipes laid along the arm to the mercury seal at the centre, and was connected to a Pitot tube mounted at the end of the arm. The static pressure was taken from a tube lying on the floor and protected from draughts, the position being directly below the circle traced by the Pitot tube. The readings so obtained were very definite, but only gave a velocity of 1·6 m.p.h. at an arm speed of 35 m.p.h. This is 0·4 m.p.h. less than that obtained by the anemometer, the difference being twice as great as was considered satisfactory. After repeating the experiments with the same results it was suspected that in the neighbourhood of the arm mean conditions did not exist, and that the estimation by the second method was probably the one required. To check this conclusion measurements of the swirl velocity 2 ft. from the floor and 4 ft. below the arm were taken with the anemometer, giving 1·5 m.p.h. at an arm speed of 35 m.p.h. The Pitot tube measurement at the same place by the second method gave 1·6 m.p.h., *i.e.*, was in sufficiently good agreement. Having obtained this agreement, one of the Laboratory Standard Dines tubes was calibrated in this position, and its constant obtained from the known value of the air swirl in this position. The Dines tube was then placed on the arm in the same position as the original Pitot tube, and the pressure indications obtained for that position. From the calibration as determined above the air swirl was deduced, and it was found to agree with the Pitot tube determination of the air swirl.

It was therefore concluded that the air swirl correction for test on the arm was 1·6 m.p.h. at 35 m.p.h., and was approximately proportional to the arm speed.

5. **The Testing of the Strength and Elasticity of Fabrics for Balloons and Airships.**—The investigation into the best form of test-piece for simple tensile tests has resulted in the adoption, as a temporary standard, of a rectangular specimen 2 ins. wide and 6 ins. long between the grips. The reasons for this decision were that specimens longer than about this size gave the same results, while smaller ones gave higher values. For these tests the Avery fabric-testing machine, which was installed during the year, is now used.

It has been noticed that the local variations of strength in a fabric are generally gradual, whereas the variations over large areas are considerable; in consequence of this, when

* See FLIGHT, Mar. 26th, 1910.

performing a test on a sample of fabric, several specimens are cut, where possible, from widely separated parts of the sample, and the mean of these taken as the mean strength. It is found that although individuals of such a group often differ by 20 per cent., the means of two groups from the same sheet of fabric will ordinarily agree to 2 or 3 per cent. and in consequence this method is invariably used in research tests.

The apparatus for making bursting tests under air pressure on fabrics has been constructed and found to work satisfactorily. The specimens are in the form of sleeves of the fabric 30 ins. long, 5 ins. diameter, into the ends of which are fitted solid flanged brass discs. This apparatus has also been adapted with some modifications for making compound stress tests on the same form of specimen by applying longitudinal tension combined with internal pressure. At the instant of bursting, both the longitudinal tension and the internal pressure are recorded. Extensometer readings on length and diameter are taken during the progress of the test.

Investigations into the effect of a small tear on the breakdown stress of fabrics are in progress; the following results have been arrived at:—

(i) That (for simple stress) the stress at which a wounded specimen will break down is dependent on the size of the wound, but not on that of the specimen, provided that the latter is greater than what is called the "danger rectangle" (which is of the order of ten times the linear dimensions of the wound).

(ii) That (for simple stress for fabric No. 57 B North British Rubber Co.) the factor of safety for a given size of wound, being the ratio of the strength of an undamaged specimen to that of a wounded one, increases from unity for no wound to about 2½ for a wound ⅜ in. long, and shows an inclination to become stationary at about that value.

The effects of rate of loading and repeated application of simple tensile stress on the ultimate strength have been investigated for the case of a single unproofed balloon silk, the conclusions arrived at being:—

(i) If the time occupied by the test is more than about 2 mins. no difference in the ultimate strength is noticeable.

(ii) The strength found by rapid loading is greater than the above, being about 16 per cent. higher for a rate of loading in which the specimen is broken in 10 secs. than for slow rates.

(iii) Many repetitions of stress cause breakdown at a stress about 15 per cent. lower than that which breaks the specimen in a single gradual application.

The apparatus for measurement of hydrogen leakage through balloon fabrics has been in regular use all the year. Quite early it was realised that the rate of testing was too slow; consequently the whole apparatus was quadrupled, and it is now possible to test eight samples per week. For the regulation of temperature it has been found necessary to use a form of thermostat, with electric heating and invar-copper regulator, which keeps the temperature constant to about 0·2°C.; in the summer months it was necessary to adopt cooling by means of ice in order to maintain the standard temperature of 15·5° C. A few modifications in detail of the apparatus have been found advisable in order to reduce the amount of attention required.

To investigate the behaviour of fabrics under ultra-violet light a special chamber was constructed at the beginning of the year, in which a quartz-mercury-arc lamp was suspended. Deterioration is fairly rapid, but the lamp had to burn for three to four months in some experiments.

A preliminary report was presented to the Advisory Committee in the summer, and a further report is now in hand.

The relation of permeability to temperature has also been measured; in the case of rubber-proofed fabrics a rapid rise in the rate of leakage has been found accompanying rise of temperature—with other materials this is not marked.

The effect of exposure to the weather on hydrogen leakage has also been studied. For this purpose large boards have been fixed on the roof of the Metallurgy building, and on these the specimens are pinned, being taken down after a certain length of exposure. Some interesting results have been communicated to the Committee. The moisture absorption of various fabrics has been determined by noting the increase in weight when they were either soaked in water or exposed to moist air at a constant temperature.

The inflammability and rate of combustion of a number of fabrics have been determined (Mr. Sutton). The tests were made by bringing the fabric into contact with a platinum wire which was heated by the passage of an electric current, the temperature of the wire being determined by measurement of the potential drop along the wire between two fine platinum leads welded to the main wire a known distance apart. Among rubbered fabrics the ignition temperature, that is to say, the temperature to which the wire had to be raised in order to cause the fabric to flame when brought into contact with it, was found not to vary very widely, but the rate at which the flame spread along the fabric differed considerably in different cases.

The detection of hydrogen leakage from balloons particularly when housed in closed sheds has formed the subject of a series of experiments and as a result of these it is hoped that practicable instruments will shortly be available, one for giving a continuous and automatic record of the percentage of hydrogen present in the atmosphere of the balloon shed or other closed space, the other intended for the purpose of searching for and locating leaks in the balloon envelope.

A series of experiments have been begun and are now in progress for determining the properties of a number of substances as proofing materials for rendering silk and cotton fabrics impermeable to hydrogen; some encouraging results have already been obtained.

Income Account—Receipts, 1900–1910.

Year.	Treasury Grants.	Fees for work done, Donations and other Sources.			Treasury Grants for Aeronautics Maintenance.		
	£	£	s.	d.	£.	s.	d.
1900	4,000	4,294	0	10	—		
1901	4,000	4,282	7	1	—		
1902	4,000	5,314	19	3	—		
1903	4,000	6,200	4	3	—		
1904	4,000	8,753	3	9	—		
1905	5,125	8,512	0	5	—		
1906	5,875	8,444	4	10	—		
1907	6,000	11,058	17	5	—		
1908	6,750	15,121	10	2	—		
1909	7,000	15,746	16	5	1,523	13	5
1910	7,000	17,653	10	2	3,423	1	11
	57,750	105,381	14	7	4,946	15	4

RENAUX'S PARIS-PUY DE DOME FLIGHT.—The Maurice Farman biplane is seen arriving on the left, and on the right a closer view of the machine, with the Observatory in the background.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Annual General Meeting.

The Annual General Meeting of the Members of the Royal Aero Club of the United Kingdom will be held on Thursday March 30th, 1911, at 5 o'clock, at 166, Piccadilly, London, W.

The Agenda was published in FLIGHT last week.

Committee Attendances.

The number in brackets shows the maximum attendance possible.

Name. *Note.*—Where no attendances are recorded against a member's name in the following table it signifies that that member is not a member of the particular committee.	Executive. (42)	Finance. (17)	Competitions. (11)	House. (2)	Balloon. (2)	Technical. (4)	Foreign Conferences ++ (3)	Library. (1)	Grounds Inspection.
	Meetings Attended.								
Griffith Brewer	37	14	2		2	2	2		
Ernest C. Bucknall	40	16	10	2		2			6
Col. J. E. Capper, C.B., R.E.	10								
Maj. C. deW. Crookshank, R.E.	2								4
John Dunville	18			1					3
Cecil S. Grace	5								
Capt. A. H. W. Grubb, D.S.O., R.E.	3								
Col. H. C. L. Holden, R.A., F.R.S.	10*		7						
Prof. A. K. Huntington ...	30	11	10			4		1	4
V. Ker-Seymer	14		3	1			3		4
E. Manville	2†								
F. K. McClean	17						1		
J. T. C. Moore-Brabazon ..	27		8				1		4
C. F. Pollock	38				2				
Hon. C. S. Rolls	7		1						
Sir Charles D. Rose, Bart., M.P.	12	8							
J. Lyons Sampson	7					4			
A. Mortimer Singer	7								
Stanley Spooner	40							1	
Hon. A. Stanley, M.P. ...	2	1							
Roger W. Wallace, K.C. ...	32	8	7		2		1		
Maj. Sir A. Bannerman, Bart., R.E.					2				
A. E. Berriman						2			
Philip Gardner...					2				
C. G. Grey								1	
C. G. Grunhold							1		
Maj. F. Lindsay Lloyd ...			10			1			3
Mervyn O'Gorman			8				2		
J. W. Orde			1						
G. Holt Thomas							1		
G. Stanley White							1		

* Elected September 6th, 1910. Meetings held since election, 21.
† Elected February 7th, 1911. Meetings held since election, 4.
‡ Includes two meetings of Federation Aeronautique Internationale and one of the European Circuit Conference.

Committee Election.

In accordance with the rules, the Committee shall consist of eighteen members. Members are elected to serve for two years, half the Committee retiring annually. Retiring members are eligible for re-election.

The following is a list of those who have been nominated, and who have signified their willingness to serve :—

Lieut. B. H. Barrington-Kennett	*Prof. A. K. Huntington
*Griffith Brewer	*F. K. McClean
G. B. Cockburn	A. Ogilvie
*Major C. de W. Crookshank, R.E.	Mervyn O'Gorman
Capt. Bertram Dickson	*C. F. Pollock
*John Dunville	*Stanley Spooner
D. Graham-Gilmour	G. Holt Thomas
*Col. H. C. L. Holden, R.A., F.R.S.	Sir George White, Bart.
	Howard T. Wright

* The names marked with an asterisk are those of members of the present Committee.

A ballot paper for the election of nine candidates to seats on he Committee of the Club has been forwarded to each member.

No Ballot Paper which is signed, or on which the number of Candidates voted for is more or less than the number of vacancies, or which is received by the Secretary later than **12 noon, Wednesday, 29th March, 1911,** will be valid.

Committee Meeting.

A meeting of the Committee was held on Tuesday, the 21st inst., when there were present :—Mr. R. W. Wallace, K.C., in the chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Col. H. C. L. Holden, R.A., F.R.S., Prof. A. K. Huntington, Mr. V. Ker-Seymer, Mr. E. Manville, Mr. C. F. Pollock, Mr. Stanley Spooner, and Harold E. Perrin, Secretary.

New Member.—The following new member was elected :—Col. Lewis Montgomery Murray Hall.

Scrutineers of Committee Ballot.—The Scrutineers of the Ballot have been appointed as follows : — J. Stewart Mallam (Andrew W. Barr and Co., Chartered Accountants) and F. Harold Sully (J. and A. W. Sully and Co., Chartered Accountants).

Statue of Liberty Protest.

On March 15th, 1911, a cablegram was received from the Aero Club of America, announcing the new classification, and awarding the Prize to Jacques de Lesseps. The Royal Aero Club immediately cabled a protest to America and lodged an appeal with the Federation Aeronautique Internationale.

The Royal Aero Club will apply for a Conference to be held at an early date to finally settle the matter.

International Aero Exhibition at Olympia.

The International Aero Exhibition, held by the Society of Motor Manufacturers and Traders under the auspices of the Royal Aero Club, will open on Friday, March 24th, and terminate on Saturday, April 1st, 1911.

The following machines will be exhibited on the Club Stands :—

Blériot 100-h.p. Gnome with which C. Grahame-White won the Gordon-Bennett Aviation Trophy.

Howard Wright biplane with which T. O. M. Sopwith won the Baron de Forest £4,000 prize.

Cody aeroplane with which S. F. Cody won the British Empire Michelin Trophy.

"Baby Wright" biplane as flown by Alec Ogilvie in the Gordon-Bennett Aviation contest at Belmont Park.

There will be in addition to the above a large exhibit of models.

Members of the Royal Aero Club will be admitted free on production of their membership cards.

A room in the Princes' Gallery will be placed at the disposal of the members during the Exhibition.

"Daily Mail" Second £10,000 Prize.

The full rules governing this contest will be found in this issue on page 251. Entry forms can be obtained from the Royal Aero Club.

European Circuit.

The contest will start from Paris on June 5th, 1911, and the competitors are expected to reach England shortly after June 24th, 1911. The various prizes offered in Paris, Germany, Belgium, Holland and England amount to over £20,000.

The arrangements as regards England will be carried out by the Royal Aero Club, and the following sub-committee has been appointed for that purpose :—

Ernest C. Bucknall, V. Ker-Seymer, J. T. C. Moore-Brabazon, M. O'Gorman, R. W. Wallace, K.C., and H. E. Perrin (Secretary).

Gordon-Bennett Aviation Cup.

The date for the contest has now been fixed for Saturday, July 1st, 1911.

The following countries have entered for the Gordon-Bennett Aviation Cup :—

America.	France.	Great Britain.
Austria.	Germany.	

Each country will be represented by three competitors.

In order to give as much time as possible, the Royal Aero Club has extended the date of entry for the British competitors to May 1st, 1911. Intending competitors are requested to notify the Secretary of the Royal Aero Club on or before that date, of their willingness to compete, if chosen. Entries must be accompanied by a remittance of £20, which amount will be returned should the entrant not be selected.

HAROLD E. PERRIN.
Secretary.

166, Piccadilly.

PROGRESS OF FLIGHT ABOUT THE COUNTRY.

NOTE.—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries in future to see that the notes regarding their Clubs reach the Editor of FLIGHT, 44, St. Martin's Lane, London, W.C., by first post Tuesday at latest.

A.A. and M.U. Aviation Section.

A RECEPTION room has been arranged at Stand No. 9 at Olympia for the use of members visiting the Show. Members' correspondence and communications may be addressed c/o. A. A. and M. U. Aviation Section, Stand No. 9, Aero Exhibition, Olympia, S.W.

On Wednesday, April 5th, Mr. Handley Page will read a paper entitled "The Flow of Air Round Planes and Bodies." The paper will be illustrated by lantern slides of various stream lines. The concluding paper of the session will be given on Tuesday, April 11th, when Mr. A. C. Horth, Chairman of the Aero-Models Association, will lecture on "The British Pioneers of Aviation."

Bristol and West of England Ae.C. (STAR LIFE BLDGS., BRISTOL).

IN presiding at the annual general meeting of the club at headquarters on the 15th inst., Sir George White said he believed the club held the lead in the provinces so far as strength and practical work was concerned. It was particularly gratifying that Bristol was taking this lead, and the announcement made by Mr. Haldane in the House of Commons on the previous day, that four Bristol biplanes had been ordered for the use of the military, must also be encouraging to members. No doubt tremendous interest would be centred in the *Daily Mail* competition next July, and Bristol would undoubtedly worthily uphold its reputation when the competitors reached there. Sir George White moved that the committee's report should be received, and the resolution was adopted unanimously.

According to the report the membership now stands at 84, and it is hoped that very shortly there will be a substantial increase. During the past month or two the opportunities for using the full-size biplane glider, built by the British and Colonial Aeroplane Co., have been very few, but it is hoped before long to obtain a flying ground so that members who have graduated in gliding can blossom out into aviators. It is hoped that members will come forward to help in making local arrangements in connection with the contest for the *Daily Mail* £10,000 prize. Special interest should be taken in the section from Manchester to Bristol, inasmuch as Sir George White has offered a prize of £250 for the competitor who completes that stage in the shortest time.

Sir George White was re-elected President, and Sir Herbert Ashman, Bart., Mr. Samuel White and Mr. Stanley White were re-elected Vice-Presidents, Mr. H. W. L. Harford and Mr. A. A. Jenkins Hon. Treasurer and Hon. Secretary respectively, while the Committee was chosen as follows: Col. T. W. Chester-Master, Messrs. A. E. Catford, G. H. Challenger, C. Chester-Master, G. B. Dacre, T. W. Egerton, J. R. P. Evans, C. R. Fry, H. Robinson, and H. Thomas.

48th Glasgow Troop Boy Scouts' Model Aero Club.

AT a meeting of the club held in the Drill Hall, 285, Rutherglen Road, Glasgow, the following office bearers were elected for the ensuing year: President, Adjt. S. M. J. S. Gordon; Vice-President, P. L. Wm. Clanachan; Secretary and Treasurer, Corpl. John Brown, 104, Mathieson Street, S.S., Glasgow. The club gave a display of model flying before Lt.-Gen. Sir R. S. S. Baden-Powell, K.C.B., on March 18th, at the drill field, Dixon Road, Crosshill. Other interesting items are under consideration at present, and the club hopes to create a good impression in model flying during the forthcoming summer.

Sheffield Model Aero Club (35, PENRHYN ROAD).

A SPECIAL general meeting of the above club was held on Wednesday, March 8th, at the workshop, which is situated at the rear of 74, West Street. The meeting was presided over by Mr. W. Blake, who in a very interesting speech urged the members to put all their energy into model construction. The members were greatly interested when the secretary made it known that Mr. Maxfield, of the Forge Dam, Whiteley Woods, Sheffield, had given permission for the club to hold their first flying competition across the Dam on Easter Monday. One of the members hopes to have a model dirigible finished for the event, which should cause a good deal of interest among model enthusiasts. Anyone wishing to join the above club should communicate with the secretary.

Yorkshire Aero Club (HOTEL METROPOLE, LEEDS).

THIS season's lectures have attracted large and appreciative audiences. At the last meeting, Mr. Robert Blackburn, the Leeds aeroplane constructor and propeller maker, gave an address on "Propellers." For greatest efficiency he recommended the use of propellers of large diameter run at a speed of not more than 800 to 900 revs. per min. Most engines, he said, ran at considerably over 1,000 revs. per min., and thus the propeller, which was generally mounted direct on the engine-shaft, must be of smaller diameter, causing a great loss of efficiency in the transformation of energy. The future would even make this matter worse, as it was quite certain engines would be run up to 2,000 or even 3,000 revs. per min. The static thrust of a propeller decreased with an increase in the pitch, and if the pitch ratio was too high a fan or blower action would be set up, and the propeller would cease to act as a screw. A high-speed engine with a slowly-revolving propeller would give the greatest efficiency. To obtain this desirable result some form of reduction must be employed. In the discussion which took place, led by the chairman of the club, Mr. Stuart A. Hirst, the hope was expressed that at an early date facilities would be afforded at the University of Leeds for the thorough test of aerial propellers.

The other lectures are, on April 11th, by Prof. Bramhall, of Bradford, on "Lighter than Air Machines," and on April 25th, by Mr. H. Knowles, whose address is announced as "Accidents and Axioms."

SCHOOL AERO CLUB.

Arundel House School Ae.C. (15, ARLINGTON ROAD, SURBITON).

ON Saturday last the members held their third annual kite contest at Sandown Park, Esher. Although some rain fell, the wind was very suitable for kite-flying, and a most interesting afternoon was spent by both competitors and spectators. Mr. Wilfrid L. Evershed, one of the Hon. Vice-Presidents, who has officiated in that capacity on so many occasions, again kindly acted as Judge. The tests imposed were as follows:—(1) Angle of cord, (2) stability, (3) weight-lifting, (4) altitude. (5) promptness of ascent. The first prize in the Senior Branch contest (silver medal with gold centre) was awarded to Crawford Griffiths who entered a Scarf kite of 16 sq. ft.; the second prize in the same event (mechanical model aeroplane winder) falling to C. K. Scarf, whose entry was a Brookite of 50 sq. ft. In the Junior Branch contest the first prize (silver medal) was carried off by R. Pears, who flew a Scarf kite of 16 sq. ft., and the second (mechanical model aeroplane winder) by N. Whitechurch, who competed with a 36 sq. ft. Ridleykite. All the prizes were generously given by Mr. W. Spikins, of Kingston Hill, one of the Hon. Vice-Presidents, to whom many thanks are due.

NEVER TOO EARLY TO START.—The youngest competitor in the Arundel House School Aero Club's annual kite contest.

Some remarkable results were obtained in the course of the weight-lifting tests, a Ridleykite of 36 sq. ft. area lifting 29 lbs., and a Brookite of 50 sq. ft. 27 lbs. The angle of cord on several of the kites was also exceptionally good, varying between 60° and 70°. The proceedings, which lasted three hours, were terminated by a display of one of Cyril Ridley's team of man-lifting kites, and the 80 sq. ft. of this monster exercised such a pull that the united efforts of all the club members were required to get it down again. Arrangements are being made for the holding at an early date of a model glider competition, which promises to be of exceptional interest. A Mann monoplane, of similar design to the machine that recently kept the air for 55 secs. and covered a distance of 1,400 feet, is now being exhibited at the Aero Show at Olympia.

THE "DAILY MAIL" SECOND £10,000 PRIZE.

REGULATIONS GOVERNING THIS 1,000 MILE BRITISH CONTEST.

IT would be difficult to find anything better calculated to bring home to the public the progress that has been made and is day by day being made by designers and manufacturers of flying machines and of specially light engines, than the nature of the competition to be held at the end of July and beginning of August for the second £10,000 prize offered by the *Daily Mail*. A trip of a thousand miles over a specified course and within certain clearly defined periods, but the whole event being concluded within a single fortnight, is a type of performance that even now may be deemed outside the capabilities of those connected with the science and practice of aeronautics to a very large number of the people at home as well as abroad. Yet even the very fact that the Royal Aero Club, representing the Federation Aeronautique Internationale, should have felt justified in drawing up rules for such a competition as this must appeal with irresistible force to the world at large, while those in closer touch with the developments that are going on in our midst are justified in their confidence that not only will this remarkable performance be performed, but that quite likely numerous pilots with their machines will succeed in covering the complete distance within the time allowed. Below we now give in full the official regulations that have been issued, together with a map that clearly shows the route to be followed and the various compulsory stopping places.

"Daily Mail" Second £10,000 Prize.

(*Under the rules of the Royal Aero Club and the Federation Aeronautique Internationale.*)

The Proprietors of the *Daily Mail* have offered the sum o £10,000 to be awarded to the aviator who shall have completed a prescribed circuit of approximately 1,000 miles on an aeroplane in flight in the shortest time within the appointed dates, the award to be made by the Royal Aero Club in conjunction with the Directors of the *Daily Mail*.

Regulations.

1. **Date of Contest.**—The contest will commence on Saturday, July 22nd, 1911, and will finish at latest, Saturday, August 5th, 1911, at 7.30 p.m.

2. **Qualification of Competitors.**—The contest is open to competitors of any nationality holding an aviator's certificate issued by the International Aeronautical Federation, and duly entered on the competition register of the Royal Aero Club.

3. **Entries.**—The entrance fee is £100, and entries, which must be made by the competitor himself, will be received up to 12 noon, June 1st, 1911. The entrance fee of £100 is payable either in one sum or as follows:—

£25 by 12 noon on June 1st.
£75 ,, ,, July 1st.

Late entries will be received up to 12 noon, July 1st, 1911, in which case the entry fee will be £200.

The entry form, which must be accompanied by the entrance fee, must be sent in to the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

No part of the entrance fees is to be received by the *Daily Mail*, but all amounts received will be applied towards payment of the expenses of the Royal Aero Club in conducting the competition.

4. **Course.**—The course is divided into the following sections:—

SECTION 1.—**Brooklands to Hendon (Control)** ... 20 miles.

SECTION 2.—**Hendon to Edinburgh.**

Hendon to Harrogate (control)	...	182 miles
Harrogate to Newcastle (control)	...	68 ,,
Newcastle to Edinburgh (control)	...	93 ,,
Total for Section 2	...	343 ,,

This Section closes at 4.30 p.m. on Saturday, July 29th, 1911, by which time all competitors must have started in Section 3.

SECTION 3.—**Edinburgh to Bristol.**

Edinburgh to Stirling (control)	...	31 miles
Stirling to Glasgow (control)	...	22 ,,
Glasgow to Carlisle (control)	...	86 ,,
Carlisle to Manchester (control)	...	103 ,,
Manchester to Bristol (control)	...	141 ,,
Total for Section 3	...	383 ,,

This section closes at 4.30 p.m. on Wednesday, August 2nd, 1911, by which time all competitors must have started in Section 4.

SECTION 4.—**Bristol to Brighton.**

Bristol to Exeter (control)	...	65 miles
Exeter to Brighton (control)	...	149 ,,
Total for Section 4	...	214 miles

This section closes at 12 noon Saturday, August 5th, 1911, by which time all competitors must have started in Section 5.

SECTION 5.—**Brighton to Brooklands (Final Control)** ... 40 ,,

Total ... 1,000 ,,

A competitor who has not left the above sections before the specified dates and times will be automatically retired from the competition.

5. **Controls.**—A control is situated in or near each of the towns mentioned in paragraph 4, and competitors must make a landing at each control. The time of arrival will be taken at the moment of landing within the boundary of the control, where the official time-keepers will be stationed.

6. **Compulsory Resting Time.**—Each competitor must expend a minimum aggregate of 12 hours while his machine is on the ground in the controls in each of the sections 2, 3 and 4. These three periods of 12 hours shall be called "resting time." No competitor shall be permitted to start in section 3, 4 or 5 until the 12 hours "resting time" shall have elapsed in sections 2, 3 and 4 respectively. A competitor may expend as much as he likes of his "resting time" at the starting control in Sections 2, 3 and 4, but after having been once officially started from any control, the whole time until he reaches the next control will be counted as flying time.

7. **Starting Place.**—The start will be made from Brooklands on Saturday, July 22nd, 1911, at 3 o'clock p.m.

8. **Order of Starting.**—The order of starting from Brooklands

Sketch Map of the route.

will be drawn by lot and announced seven days prior to the start of the competition. Each aeroplane will be allotted a number which will correspond with the order of starting. This number must be displayed on the aeroplane in conspicuous places approved by the officials.

9. **Starting.**—The aeroplanes must be on the starting place 15 minutes before the time of starting, and any competitor failing to start within 3 minutes of his official starting time must remove his aeroplane out of the way if and when so ordered, and shall only be allowed to restart with the sanction of the official starter, and his time shall be taken as from the original order to start.

10. **Start from Hendon.**—The competitor who makes the fastest elapsed time from Brooklands to Hendon shall start first from Hendon at 4 a.m. on Monday, July 24th, 1911, the others following at intervals determined by the difference between the time of their respective flights and the time of the fastest flight.

11. **Time Cards.**—Each competitor before starting will be supplied with a time card on which will be entered his time of arrival and departure from each control. The competitor is alone responsible for the safe custody of his card and for its being produced and entered up at each control and for the production of same when duly called upon.

12. **Stoppages.**—Stoppages *en route* between the controls are not prohibited.

13. **Timing.**—Competitors will only be timed from the departure from any one control to the arrival at the next control. The time taken to accomplish each section will be the times which have elapsed between the departures and arrivals at the various controls within the section, with the addition of any time spent in the controls in each of the sections 2, 3 and 4 over and above the 12 hours' "resting time."

14. **Repairs.**—Individual replacements and repairs to the aeroplane and motor may be made, but neither may be changed as a whole. Five parts of the aeroplane and five parts of the motor will be stamped or otherwise marked, and at least two marked parts of each of these five must be in place on arrival at each control. Landing chassis and propellers will not be marked.

15. **Identification of Aeroplanes.**—Competitors must have their aeroplanes completely erected at Brooklands not later than 10 a.m. on Thursday, July 20th, 1911, in order that they may be marked by the officials. Any competitor not having his aeroplane ready by the specified time will render himself liable to exclusion from the contest.

16. **Examination at Final Control.**—Each machine on arrival at the final control must remain on the ground for exhibition and examination for at least 24 hours from the time of arrival.

17. **Shed Accommodation.**—Accommodation for his aeroplane will be provided free to each competitor at Brooklands from 9 a.m. on Saturday, July 15th, 1911.

General.

1. A competitor by entering thereby agrees that he is bound by the regulations herein contained or to be hereafter issued in connection with this competition.

2. The interpretation of these regulations or of any to be hereafter issued shall rest entirely with the Committee of the Royal Aero Club.

3. The competitor shall be solely responsible to the officials for the due observance of these regulations, and shall be the person with whom the officials will deal in respect thereof or of any other question arising out of this competition.

4. A competitor by entering waives any right of action against the Royal Aero Club or the Proprietors of the *Daily Mail* for any damages sustained by him in consequence of any act or omission on the part of the officials of the Royal Aero Club or the Proprietors of the *Daily Mail* or their representatives or servants or any fellow competitor.

5. The aeroplane shall at all times be at the risk in all respects of the competitor, who shall be deemed by entry to agree to waive all claim for injury either to himself, or his aeroplane, or his employees or workmen, and to assume all liability for damage to third parties or their property, and to indemnify the Royal Aero Club and the Proprietors of the *Daily Mail* in respect thereof.

6. The Committee of the Royal Aero Club reserves itself the right to add to, amend or omit any of these rules should it think fit.

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BRITISH NOTES OF THE WEEK.

Gordon-Bennett Race Date Changed.

IN order that dates in the European Circuit Race may not clash with the Gordon-Bennett Race, it has been decided to postpone the latter event from June 28th to July 1st.

Sir Hiram Maxim and Aeronautics.

ANNOUNCEMENT has been made this week of the resignation of Sir Hiram Maxim as a director from Messrs. Vickers, Sons and Maxim, Ltd., and incidentally that the firm propose to change their title to "Vickers, Ltd." Sir Hiram, being of an active disposition, is not giving up work altogether, and states that he is engaged in designing, in collaboration with Mr. Claude Grahame-White, a military aeroplane, which should be ready in about three months' time. He also states that M. Blériot may be associated with them in the work, and that the new machines will be built at Hendon.

Brooklands-Hendon Competition.

THE strong winds which blew on Saturday afternoon prevented anything in the nature of cross-country flying, and so no further attempts were made to win the prizes offered jointly by the Brooklands A.R.C. and Mr. Claude Grahame-White. The winner of the first prize of £30 is therefore Mr. G. Hamel, who on the previous Saturday accomplished the double journey in 58 mins. 38 sec., the trip from Hendon to Brooklands taking 29 mins. 32 secs. and the return trip 29 mins. 6 secs. The second prize goes to Mr. J. V. Martin, who on the Grahame-White biplane flew from Hendon to Brooklands in 31 mins. 31 secs. and from Brooklands to Hendon in 1h. 18m. 57s., this including, of course, the time taken in the unintentional detour to St. Albans.

Statue of Liberty Prize.

OFFICIAL confirmation has now been received that the Aero Club of America have reconsidered the award of the Statue of Liberty prize, and awarded it to Jacques de Lesseps, as announced in our issue of last week. It will be seen from the official notices of the Royal Aero Club, on page 249, that protests against the decision have been lodged with the Aero Club of America, and also with the International Federation.

Mr. Paterson at Liverpool.

TAKING advantage of what seemed to be a break in the weather, Messrs. Paterson and King set out from Freshfield on the afternoon of the 16th inst. to fly to Manchester. They had only proceeded about three miles on their journey, however, when the varying currents of wind made it practically impossible to continue. In bringing the machine down Mr. Paterson had some difficulty in steering clear of some telegraph wires, and in the sudden landing the chassis of the machine was damaged and the propeller smashed.

Flying at Brighton.

ON the 16th inst., Mr. O. C. Morison rose from the Shoreham aerodrome on his Blériot monoplane and in the course of a 27 minutes' flight, travelled over to Brighton and kept above the Promenade at a moderate altitude, the flight being witnessed by large crowds.

Civilians and the Air Battalion.

REPLYING to a question by Mr. Lonsdale in the House of Commons, Mr. Haldane said the question of how the services of civilian airmen anxious to serve in the Army could be utilised in peace and in war was under consideration at the present time.

The Army and Navy Air Craft.

MR. BURGOYNE, in the House of Commons on Tuesday, asked the Secretary for War whether, in the public interest, he would consider the advisability of abandoning the limitation in regard to the various types of air craft whereby rigids alone were allotted to the Navy, whilst the Army had charge of semi-rigids, non-rigids and aeroplanes, and of creating a new war service, irrespective of either Army or Navy, to deal with all types of air craft, and to work in harmony with the existing services as an integral part of the national defences.

Mr. Haldane explained that the existing division of work was arranged by the Committee of Imperial Defence, and appeared for the present to work quite satisfactorily. He said that it must be remembered that the Advisory Committee was at the disposal of both the Admiralty and the War Office, and that the knowledge and experience of each department was thus rendered available for the other.

Flying Meeting for Edinburgh.

IN connection with the King's visit to Scotland, a proposal is on foot to organise a flying meeting under the auspices of the Scottish Aeronautical Society. The greatest trouble appears to be the finding of a suitable aerodrome, but it is hoped that it may be possible to overcome this difficulty.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Flying Ground, Eastchurch.

THE flying here has been as follows :—On Wednesday of last week Mr. Cockburn took up Lieut. Samson for a practice spin, having first tried the machine round the ground at a height of about 50 ft.

On Friday morning early the Hon. Maurice Egerton took out his new Short, and Lieut. Samson made several trials with Mr. Cockburn. During the last trip Lieut. Samson had charge of the lever.

Saturday and Sunday were blank days owing to the weather.

Monday was also too windy, but on Tuesday, the 21st inst., Lieuts. Samson and Gregory both went up with Mr. Cockburn, and the Hon. Maurice Egerton was also flying until the wind rose.

Brooklands Aerodrome.

ALTHOUGH Wednesday was a blank day last week owing to bad weather, Thursday saw a change, and one of the first out was Mr. Billing. Having made several good flights he finished with a big smash to his machine when attempting a right hand turn. The machine skidded inwards, the undercarriage giving way under the strain, Mr. Billing being thrown out and rather nastily cut about the face. As a result a doctor had to put in a few stitches and to remedy a biggish gash in one ear. Had he worn a helmet he would probably have escaped uninjured. Mr. Fisher has joined the Hanriot school and had his first lesson in rolling as this was his first experience of a machine which is steered by the feet. He had to retire owing to a tyre bursting. Mr. Gordon-England hopes to have a 50-h.p. Clerget in the Hanriot before the end of next week. Mr. Spencer was out but did not do much owing to his engine miss-firing. Mr. Sopwith, after making several passenger flights, Mr. Hamel taking the part of passenger on one or two occasions, took out his monoplane and at last succeeded in leaving the ground, making straight flights the length of the ground. The behaviour of this machine is a little erratic, as it was on this machine that Mr. Sopwith won his certificate, and upon several occasions reached a height of well over 200 feet.

Friday was rather windy, but at one time during the afternoon, during a short space of calm, Mr. Astley was out on "Big Bat," and carried Mr. Sassoon as passenger. In landing down by the paddock end Mr. Astley had to swerve to one side in order to avoid a man, and one of the wheels was buckled. Mr. Fisher was out on the Hanriot making steady progress. Macfie was up for short flights, Mr. Sopwith had several passengers for trips on his biplane, and made some short flights on the monoplane.

Saturday, Sunday and Monday were all blank days owing to bad weather. Tuesday, although fine, was slightly gusty, giving little opportunity for real work. Mr. Fisher managed some straight flights on the Hanriot, and Mr. Blondeau, of Hewlett and Blondeau, brought out for the first time his new biplane, which he has built entirely by himself under licence from Mr. Farman. It is of all-British material, and reflects great credit upon its constructor, as he was flying both steadily and at high speed in the early morning. It is to be piloted by Lieut. Snowden-Smith, who has acquired it.

An injustice was done to the Roe triplane in last week's notes in ascribing the accident to Kemp, as due to the wing buckling. The mishap was really caused by the aviator turning and climbing when the tail was too low down.

Laffan's Plain.

VERY little flying has been done during the past week.

On Tuesday morning the Farman met with an accident: Capt. Burke, who was piloting it, did some rolling practice and a few short flights, unfortunately colliding with a telegraph pole and smashing one of the elevators.

On Monday Mr. Cody began to dismantle his machine in order to dispatch it to Olympia, where it will be on exhibition on the Royal Aero Club's stand. In the evening, he gave a lecture on aviation to the soldiers at North Camp.

London Aerodrome, Collindale Avenue, Hendon.

Blériot School.—On Thursday week Mr. Prier brought out the latest arrival, a "single-seater Blériot," cross-country type. In a very gusty wind he flew several circuits at 600 ft., and came down with a splendid spiral *vol plané*, during which was witnessed one of the most sensational effects to be obtained with an aeroplane. Mr. Prier cut off the ignition as he was flying against the wind, and so soon as the motor was stopped speed was reduced, as it appeared, to exactly the same speed as that of the wind at the time, and for about 45 secs. the aeroplane seemed at a standstill, hovering like a bird at a height of about 500 ft., until Mr. Prier began to make a left-hand turn, during which he drifted away at about 30 miles an hour, restarting the motor again to face the wind until he was about 50 ft. from the ground.

On Friday Mr. Prier again had the same machine out for about 10 mins., and then came to earth in his usual fine style.

Grahame-White School.—Wednesday week was an impossible day, but the following morning Greswell appeared at 9 o'clock with the school Farman, which he tested during a 10 minute flight. After a short trip with Hubert, Greswell gave a lesson to Mr. Sidney Shaw, taking him for ten laps of the aerodrome at a considerable altitude. J. V. Martin then brought out the Grahame-White "New Baby" biplane, and after making a good solo flight of half an hour's duration turned his attention to experimenting with the machine's passenger-carrying capabilities. With the chief engineer as passenger, he covered a number of circuits at a hight of over 100 ft., the machine showing extreme steadiness and developing a speed of quite 55 m.p.h. The ascent was remarkably rapid, and considering that the extensions were not used this was a notable performance.

Mr. Grahame-White had meanwhile arrived at the aerodrome, and made several laps on the school Farman, afterwards taking up a lady friend as passenger. Two lengthy flights by Hubert, one with the pupil Turner, terminated the day's proceedings.

The weather, from Friday the 17th until Tuesday the 21st, was notoriously bad, and flying operations had to be unwillingly suspended.

Tuesday morning did not give a great deal of promise, but the wind dropped at about 11 o'clock and the mist cleared. Greswell was out first as usual, on the school Gnome-Farman, following which Hubert took a turn preparatory to giving a lesson to Ridley-Prentice. Turner, taking over the control with the intention of attempting a turn, surprised everyone, probably including himself, by making a really good flight of four circuits. Not to be outdone, Ridley-Prentice mounted the machine, and although it was his first experience at turning managed a similar number of laps of the aerodrome in good form, landing quite lightly and skilfully.

A very interesting feature of the day's flying was the appearance of Greswell, Hamel and Prier simultaneously on their respective Gnome-Blériots, the latter's machine being the one that was used by the victorious Leblanc in the Circuit de l'Est, but which has since been thoroughly overhauled and brought up to date. It is fitted with a wind screen, speed indicator, altitude recorder, and compass, while on the back of the pilot's seat is strapped a hold-all containing a selection of Gnome "clés" and spare parts.

Turner presently got going again on the school Gnome-Farman, and improved on his last "score" by making a flight of seven circuits, keeping at a very respectable altitude. On his descent Ridley-Prentice took control and circled the aerodrome five times. Meanwhile Greswell had started off on the 40-h.p. E.N.V. Blériot and flew for a quarter of an hour, descending eventually *en vol plané*. At 5 o'clock Mr. Grahame-White arrived at the aerodrome to test his new military Farman which had arrived and was erected during the week. After a solo flight he ascended with Miss Pauline Chase and was soon lost to sight in the direction of Edgware. Passing over this village at a height of 800 ft. he made a wide detour round Wembley, returning to the aerodrome after an absence of half-an-hour, gliding to earth with consummate skill. During their absence Ridley-Prentice did a fine bit of flying, improving on his last effort by making 11 laps, following which, Turner, evidently determined not to be beaten, eclipsed by one of 14 laps.

Salisbury Plain.

THURSDAY of last week was a bright morning, but as the wind had not moderated in the slightest no flying was possible till 5 p.m. The breeze even then was very treacherous, but in spite of this M. Tetard resolved to make a trial on the No. 12 Bristol. The engine was started up, and the biplane rose in the air after only a very short run, M. Tetard steering it round Fargo Camp and Stonehenge, bringing it to rest just by the hangars. The following morning was fine and frosty, and the Bristol machines were out early, M. Tetard being very busy giving instruction to various pupils. Little happened until Tuesday morning, which opened very windy and with a thick mist over the flying ground. M. Tetard was out on No. 12 Bristol, for a circular flight of about three miles, after which M. Tabator took over the machine and made three circuits, incidentally demonstrating his extraordinary control of the machine when turning. The afternoon turned out fine with plenty of sun, but the wind was still treacherous. M. Tetard took a turn with No. 19 Bristol, fitted with extensions, and made a short flight during which the 70-h.p. Gnome engine behaved splendidly. On landing M. Tabator changed places with M. Tetard, and took the machine for a trip of about 14 miles, during which he rose to a height of 2,000 ft. While this flight was in progress M. Tetard brought out another machine and the two machines in the air simultaneously made a fine spectacle. M. Tabator finished his flight by a very fine *vol plané* from a height of 2,000 ft. Subsequently both he and M. Tetard took up several visitors as passengers besides the pupils Messrs. Turner, Maitland, Stevens, Fleming and Philpot.

THIRD INTERNATIONAL AERO EXHIBITION AT OLYMPIA 1911

THE EXHIBITORS.

FOR obvious reasons, considering the date of issue, it is unfortunately impossible for us to do more this week than make a general rather than a complete reference to the exhibits at Olympia. But even a preliminary look round in advance can be made to divulge some matters of interest, particularly when, as happens to be the case, it is possible to write "British-built" against fourteen of the collective products of the seventeen firms who are down to show aeroplanes. This is something at any rate for the pessimist to cogitate upon, to whom it may also be pointed out that there are other prominent British firms who build successful aeroplanes and are not represented at all. Why they have taken this attitude of aloofness at a period when a spirit of enthusiasm for general progress should permeate all ranks of this new industry is difficult to explain nor does it seem needful at the moment to inquire. Sufficient interest at any rate attaches to those who have come to the fore, and who are thus doing their best to popularise the movement among the public from whom the industry must directly or indirectly receive the financial support on which alone it can continue to exist.

There is not the least doubt in our minds that the prophecy of an uncommonly interesting show must prove to be a true forecast of public opinion on Olympia this year, and we believe that even the man in the street is not so apathetic but that he can awake to a little feeling of personal concern in the frequent evidences at Olympia of what British enterprise and British inventiveness are accomplishing. Some names he will recognise immediately, others have not yet come so much into prominence. Some of the machines, too, will be familiar as belonging to the popular types of the day, as for instance those admirably-built biplanes of the Farman pattern manufactured in England under the name "Bristol," by the British and Colonial Aeroplane Company, Ltd., of which Sir George White is the Chairman, and those other machines constructed by Messrs. Grahame-White—which firm represents the business activities of that very successful pilot.

The E.N.V.-engined Howard Wright biplane, shown by Messrs. Warwick Wright, is superficially of the Farman kind, but not exactly a copy; that exhibited by the Royal Aero Club on their stand of honour is the machine with which T. Sopwith carried off the Baron de Forest £4,000 prize by flying from England into Belgium. Its neighbours are the British-built Cody, with which that persevering pioneer won the much-deserved British Michelin Cup last year, and the 100-h.p. Gnome-engined Blériot monoplane—a French-built machine, with which Grahame-White won the Gordon-Bennett race in America as one of the representatives of England. The pioneer machine of America, the Wright biplane, is also represented on the Royal Aero Club's stand by one of the racing models, which was constructed in America for Mr. Alec Ogilvie, who has from the first been a staunch adherent of the Wrights and is to-day the sole exponent in England of the art of flying their machines.

For a British-built and British-designed machine that has come to the fore very much during the last year, visitors should turn to the "tail first" Valkyrie, and will be repaid by a more or less close inspection of some of its constructional details no less than by a study of its uncommon lines. Then there is the Dunne machine, which is a direct attempt to secure automatic stability by wing form, and is the outcome of experiments that in the commencement were shrouded in much mystery, having been conducted for the Government in the wilds of Scotland; it likewise is of British conception and is British-built. And again among the British contingent are the Blackburn, Sanders, Handley-Page, Humber, and Martin-Handasyde machines, all of which will be familiar to readers of FLIGHT.

Nor does this exhaust the list, for Messrs. Mulliner, the first coachbuilders to take up this work in England, are again exhibiting, and so too are Messrs. W. Cole and Sons—another well-known firm of automobile body builders who have taken up aeroplane construction. Messrs. Pigott Bros. who, as readers of FLIGHT will remember, designed a very uncommon type of machine some time ago, have now produced a new model on more conventional lines, and lastly we must mention a peculiar moving-wing machine exhibited by Mr. F. A. Bartelt, Chairman of the Polysulphin Company of Bristol.

Of foreign machines, there are only three, besides the G.B. Blériot and Wright on the Royal Aero Club stand, but they are well known. There is the famous Blériot monoplane, exhibited by the direct British representatives of this firm, who have their flying school at Hendon. A genuine Farman biplane is seen on the Aeroplane Supply Company's stand and the Breguet is exhibited by Messrs. A. Turner and Co.

In the engine section an equally healthy state of affairs, so far as British representation is concerned, exists, for among the exhibitors are Messrs. Green's Motor Patents Syndicate, who built the engine with which Cody won the British Michelin Cup, and the New Engine Company, who have succeeded in evolving one of the most interesting and so far apparently the most successful of two-stroke motors on the market. It was with one of these engines that Alec Ogilvie at one time stood first for the Michelin Prize that Mr. Cody carried off at the eleventh hour. Another aero engine built by one of the greatest motor car firms in this country, or indeed in the world, is the Wolseley, one of which is in almost daily flight at Hendon. The British-built E.N.V. engine which was used by T. Sopwith in the Baron de Forest Prize flight, is not directly exhibited by the makers but can be seen on four or five different aeroplanes in the Show. Also British are the engines shown by the All-British Engine Company, the Webb-Peet rotary engine on Messrs. Weston, Hurlin and Co.'s stand and the Lamplough motor.

The famous French Gnome engine can be seen on the Bristol biplanes and can be purchased from the makers of those machines, who are agents for these engines in England. The Renault is represented by the British house of Renault Frères, and the Dansette-Gillet engine, which is now attracting considerable attention in France, is being shown by the General Aviation Contract Company.

Of accessory firms there are any number. Revolution counters, compasses, and other high-class instruments of this character can be obtained from Messrs. S. Smith and Son, the well-known Strand watchmakers. Messrs. Gratze are also showing a combined compass and altitude meter, and Messrs. Henry Hughes and Son are newcomers as instrument makers. Tools can be bought from Messrs. Melhuish and Messrs. Brown Bros., propellers from Messrs. T. W. K. Clarke, who have their own designs, Messrs. G. W. Goodchild, who sell the Chauviere, the Aeroplane Supply Company, whose speciality is the "Asco," Messrs. A. V. Roe and Co., C. G. Spencer and Sons, and Weston, Hurlin and Co., who also construct to their own designs.

Magnetos are exhibited by Messrs. Simms, whose model is British-built, and the Mossley Hill Motor Car Works, who sell the Gibaud magneto, made in France.

Radiators are the speciality of the Motor Radiator Manufacturing Company, the Spiral Tube and Components Company, and Messrs. Lamplough.

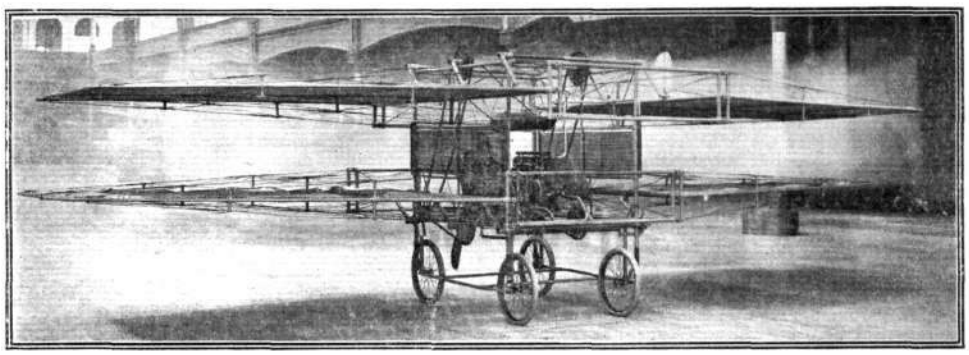
Fabric is supplied by Dunlops, the North British Rubber Company, the New Motor and General Rubber Company, Almagam, Ltd. Rubber springs are also exhibited by Messrs. Almagam, whose speciality is Rubmetal, an oil-resisting compound that can be used for pipes and connections without fear of deterioration. Lubricating oil is represented by Stern Sonneborn and Messrs. Wakefield, and there are a number of firms who, in addition to any one speciality, exhibit all manner of small detail pieces of use to the aeroplane constructors and to the owner who does his own repairs.

OLYMPIA·1911

AEROPLANES.

The following features of their exhibits have been supplied by the respective firms in question :—

F. T. Bartelt (STAND 72).—An entirely original type of machine invented by Mr. F. T. Bartelt, Chairman of the Polysulphin Co., Ltd., of Bristol. At first glance this new invention reminds one in outline of an ordinary biplane, but, scrutinised in detail, it is at once found to be very different. It is true that there is a wooden propeller, and bicycle wheels are provided for the runs along the ground when starting or alighting, but the surfaces, which for the moment one may mistake for planes, are, as a matter of fact, movable wings, and in these lies the essence of the invention. There are four wings, two—one above the other—on each side. The engine—a 40-h.p. aviation engine with four fixed cylinders—works the wings by means of a chain-drive, which actuates a series of cranks. The result is that the wings beat with great force; when the upper wings have made their stroke, the stroke of the lower wings immediately follows, thus ensuring a smooth continuity in the propulsion. The wings consist of aerocloth laced to frames made of steel tubing. Each frame is 13 ft. long, 12 ft. broad at the base, and 7 ft. at the end, giving the wing a graceful taper. Instead of the aerocloth being strained over the frames as in aeroplanes, a considerable amount of slack is allowed, with the result that at each flap the wing gives the fabric will swell out into a kind of pocket. It is expected that this will give enormous lifting power, and, of course, the sustaining surface will be much bigger than if the wings were flat, or only slightly curved



The Bartelt flying machine at Olympia.

Blackburn Aeroplane Co. (STAND 45).—Blackburn monoplane "Mercury," passenger type. In general design, the machine is composed of a body, to which are attached the two sustaining planes and where also is the pilot's seat At the front is the motor and tractor screw and at the rear the tail for stability, at the extremity of which are hinged the controlling planes for direction and altitude.

The whole is supported by a landing chassis.

The following are the characteristics of the "Mercury" :—

Body.—The body is triangular in section and tapers backwards from that point where is fixed the pilot's seat, which occupies a position behind the passenger's seat, to the rear.

The construction, which is throughout of specially selected English ash, is in the form of a lattice girder, the members of which are butted up to the three main beams in such a manner as to ensure, as much as possible, their working in compression. This method of construction gives great strength and elasticity.

The front portion of the fuselage is covered with highly polished veneered wood, and the latter part with fabric, in order to reduce head resistance.

Planes.—The main planes are trapezoidal in form.

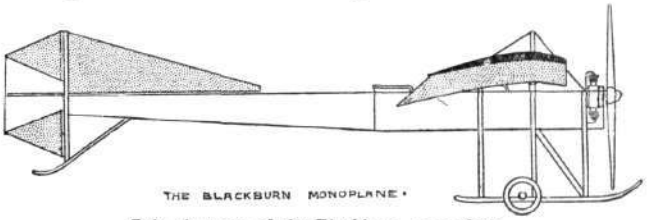
The two main spars on which the sections are built are of solid ash, grooved out along the neutral axis to form a channel section. In addition to these, lattice girder work, which is very strong, and, at the same time, light, runs the whole length of the planes, giving increased strength to counteract the upward and backward thrusts imparted to the planes whilst travelling through the air.

The sections are cut out to their true form and built up with wooden cords, forming the ribs to which is attached the fabric. The inner ends of the main spars form the attachment to the fuselage, the rear attachment being pivoted in a manner which will permit of the warping of the planes without causing the slightest strain.

Landing Chassis.—The fuselage is supported on a very strong chassis which is composed of two long skids connected to the body by ash struts and strongly braced up with high-tension steel wire.

Each skid is borne by a pair of wheels, the axle of which is held down by strong elastic shock-absorbers.

On the axle of the wheels are fitted steel springs which take any side thrust caused by the rough nature of the ground or a sideward landing. The whole arrangement allows for a deviation from the straight course.



Side elevation of the Blackburn monoplane.

Tail.—The rear portion of the body carries the tail, formed of a horizontal and vertical plane.

These are supported by vertical and horizontal ash beams, to which are also hinged the elevator and rudders. The whole is supported on a skid attached to the bottom of the vertical beam and carried up to the under portion of the fuselage.

Control.—The "Blackburn" patented triple control has been designed with the object of effecting all the necessary movements with one control. The three movements can be operated independently or simultaneously by the hand-wheel, leaving the feet free for the control of the engine.

The engine speed is controlled by a throttle lever, placed at the side of the pilot's seat, and also by a foot accelerator pedal operating in conjunction with but independent of the hand-lever. By this means the throttle-lever can be set for a minimum or any desired engine speed, and thus, by depressing the foot-pedal the engine is instantly accelerated. When it is required to retard the speed of the engine, the accelerator-pedal is released, but without any fear of stopping

the engine, as it cannot retard below the setting of the throttle-lever.

Motor.—This machine is fitted with a 50-h.p. 7-cyl., radial, "Isaacson" engine. Bore 90 mm. Stroke, 115 mm. Number of revolutions, 1,600 per min.

Propeller.—The "Blackburn" propeller.

Weight.—800 lbs. approx.

L. Blériot (STAND 43).—Blériot type XXI. Monoplanes, single-seaters, fitted with 50 h.p. Gnome engines. Also a Type XXI-"two-seater" military type monoplane, fitted with 70-h.p. Gnome engine.

Single-seater.—Dimensions: length, 23 ft. Span, 29 ft. Weight, 550 lbs.

Remarks.—This type follows closely in general design the well-known Cross-Channel type, but several improvements have been effected, viz.:—

The motor and the tanks are now covered by a metallic bonnet, which has proved a great improvement, to facilitate the power of penetration of the machine through the air at high speed, and it protects very greatly the aviator against the rush of wind caused by the propeller and the speed; this bonnet is fitted with sliding openings to obtain access to the tanks.

The top pylon holding the cables that support the wings has been altered; it is now a single one, which offers less resistance to the air, and the construction of which gives the maximum of strength to that important part.

The back wheel has been replaced by a new skid made of very elastic wood, which greatly absorbs shock in landing and brings the machine more quickly to a standstill.

The elevator or horizontal rudder consists of two ailerons fixed behind the tail, after the principle which has been so successfully used during last year on the double seater.

All the transmission cables, acting on the rudder and elevator, are doubled; all materials are submitted to the most rigorous tests with special machines, and the wings, tested with sand, on the machine turned upside down, can support without deformation or extra strain a pressure of 610 kilogs. on each wing, or a total of 1,220 kilogs. (a security coefficient of 4 according to the rules adopted by the Ae.C.F.).

This trial was made officially on March 3rd, before the delegates of the French War Ministry and other officials.

Two-seater.—Dimensions: Length, 26 ft. Span, 36 ft. Weight, 700 lbs.

Remarks.—Similar in general design to the single-seater, but has been specially designed for military work. The two seats are placed side by side and protected by a bonnet covering the motor, and with the control-levers so arranged that either of the aviators can take command in turn.

The instruments necessary to the proper use of an aeroplane in cross-country flights, such as compass, map-holder, altimeter, block-note holder, &c., are fixed on a sliding rest, which can be shifted in front of one or the other instantly.

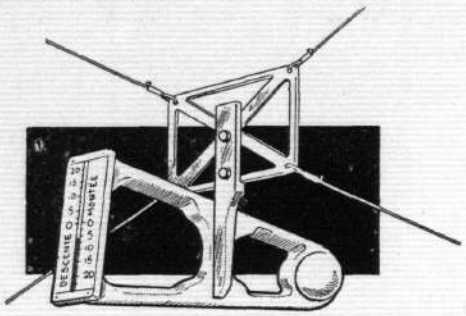
The back part of the body is entirely covered and the sides taper down to the end of the tail to reduce the effect of the side wind on the tail and balance it with the front planes when they receive a strong gust of wind.

The general shape of the machine is very graceful and the elevator is placed behind the tail, the rudder coming slightly in front of it over the fuselage.

A special very short landing skid is fitted so as to bring the tail very low down when at rest, so that the wings offer a great resistance in landing and bring the machine at rest in a very short space.

The French and Russian Governments have already ordered a great number of this type of Blériot monoplane.

Bristol (BRITISH AND COLONIAL AEROPLANE CO., LTD.) (STAND 47).—A fully illustrated description of the Bristol military type biplane was published in the last issue of FLIGHT; it is thus unnecessary to do more than refer to the



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An inclinometer of French construction to be seen on one of the Bristol biplanes. It is virtually a level gauge arranged with a vertical scale to show ascent and descent by the attitude or inclination of the machine.

presence of the Bristol machines at Olympia and mention that the biplanes are of the Farman type and represent a splendid example of high-class British workmanship.

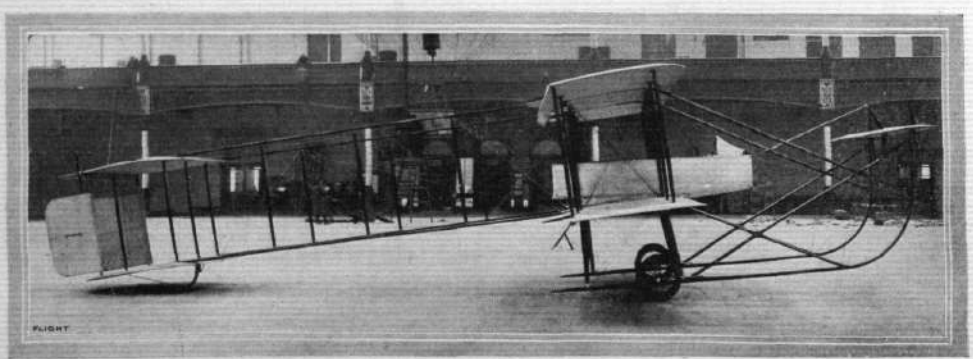
Wm. Cole and Sons, Ltd. (STAND 74).—A new type of biplane with a new engine, the whole constructed entirely by themselves. This machine is exhibited in an unfinished state.

Farman (STANDS 2 and 72.)—On the stand of the Aeroplane Supply Co., who are the English agents for Messrs. Farman Frères, will be found one of the latest military passenger type of Farman biplanes. This machine is a duplicate of that which holds the world's record for time in the air, *i.e.*, 8 hrs. 12 mins., when a distance of 380 miles was covered before coming to earth. The machine is beautifully finished and an interesting feature is that the pilot's seat is covered in similar to the body of a racing motor car, which shelters the pilot from the wind and lessens body resistance. The machine is fitted with a 60-h.p. Renault engine. We understand that the Aeroplane Supply Company are giving passenger flights on Farman aeroplanes at Hendon during the course of the Show.

Handley Page, Ltd. (STAND 73.)—Handley Page monoplane with automatic stability, due to the shape of plan, form and cross section of the wings.

The main dimensions of the machine exhibited are:—

Span, 32 ft. Chord, 6 ft. Area, 150 sq. ft. Overall length, 22 ft. Wheel base, 7 ft. Engine, 35–40-h.p. Green.



The Farman military biplane on the Aeroplane Supply Co.'s stand.

H.P. propeller, direct-coupled to engine. Weight without pilot, 420 lbs.

Control.—Upright steering wheel on top of lever. Movement left and right warps wings. Movement backwards and forwards elevates or depresses. Rotation of wheel steers.

Remarks.—Shock-absorbing device consists of spring axle with central skid. For transport purposes the wings fit on side of body, tail fits inside the body. Price, £450. Tuition free to purchasers.

Humber, Ltd. (STAND 44).—One Humber biplane. This machine is not yet complete, but it has a special interest in that it is exactly similar to the Humber biplane that has been used for the first aerial post at Allahabad, India.

Mulliner Monoplane (STAND 46).—It will be remembered that Messrs. Mulliner, of London and Northampton, exhibited a monoplane at the last Olympia Aero Show that attracted considerable attention from visitors by reason of its light appearance and the good workmanship bestowed upon it. This year they are also exhibiting, and again it is a monoplane, but this machine differs greatly from that of last year, although we have no doubt that this difference will not be found in the workmanship.

The machine, which is known as the "Kny-plane," is a monoplane having a span of 39 ft. and an overall length of 36 ft. The weight of the machine complete with aviator and in flying order is 1,250 lbs., with an actual lifting surface of 300 sq. ft. The wings are controllable, and by means of a simple steering device, similar to that used in motor car construction, it becomes possible to increase or decrease the angle of incidence and the camber synchronously or independently. The body is torpedo shaped. The power-plant, which is entirely enclosed, consists of a 60–80-h.p. E.N.V. engine with dual ignition, and drives, through a fly-wheel and a specially-designed clutch, a Normale tractor-screw. The chassis embodies some unique features, one of which, it is claimed, enables the machine to start on any railway if the ground is in any way unsuitable. This should be worthy of consideration for military requirements. It it also claimed that the body of the machine always remains horizontal in flight.

Piggott Bros. and Co., Ltd. (STAND 71).—Monoplane of unusual design and so constructed that the pilot, passengers, engine, controls, &c., are all enclosed within a streamline form.

Main dimensions :—Length, 24 ft. 6 ins. Span, 30 ft. 6 ins. Net weight, 850 lbs. Maximum chord of wings, 6 ft. 6 ins. Aspect ratio, 4·5. Fitted with 80-h.p. engine.

Control.—The controls are all from a central pillar and double wires are largely used in order to minimise any risk of accident.

Remarks.—The tractor-screw is placed in front and the stream line body is carried beyond the front of the propeller, thus cutting out the boss and the non-effective portions of the blades. The wheels and landing chassis are of the Farman type, with shock-absorbers and radius-rods. Long skates are provided carried high up in front, the wheels being set well forward of the centre of gravity.

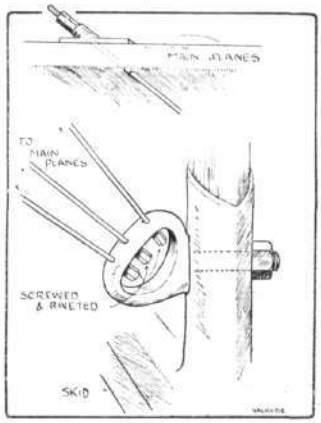
Trier and Martin, Ltd. (STAND 70).—Martin-Handasyde monoplane, two-seater.

Dimensons :—Span, 37 ft. Chord, 6 ft. (average). Area, 240 sq. ft. Length 33 ft. Weight, unloaded, 800 lbs.

Remarks.—Fitted with 50-h.p. Gnome engine. M.H. fabric, treated with M.H. wing proofing. The body is of special triangular section. Seats placed in tandem. Panelled in three-ply. The general design of the machine follows that of the single-seater now in commission at Brooklands.

Alfred Turner and Co., Ltd. (STAND 76).—Breguet biplane, three-seater "Cruiser" type. The frame of this machine is built almost entirely of steel. The wings are of the usual Breguet construction, namely, what is known as the "Supple" or "Flexible" type, and it is to this that it owes its automatic stability. The engine is a 60-h.p. Renault, running at 1,600 r.p.m., with a two-bladed wooden propeller running at half the speed. Immediately behind the engine is the assistant pilot's seat, with a supplementary control fitted. Behind this, somewhat raised, is the observer's seat, and a short distance back is the pilot's position.

There are only four steel struts between the two main wings, and the angle of incidence is very easily varied. There are no pedals, the whole of the machine being controlled by a wheel mounted on a pivoted lever. This operates the elevator and rudder and warps the upper planes. The tail is of the cruciform type, also mounted on a steel frame. The landing wheels are fitted with patent "Oleo-pneumatic" brake suspension, which gives a smooth and safe landing, even on comparatively rough ground. As on all other Breguet machines, the main planes can be folded. The total length is 8·400 m., the span of the planes 14·200m., and when folded the width is 3·600 m. The weight of the whole machine is about 520 kilogs.; speed, with total load aboard, 85 kiloms. per hour; and the total useful weight-carrying, that is to say, passengers and fuel, is 300 kilogs. Its radius of action is about 500 kiloms.



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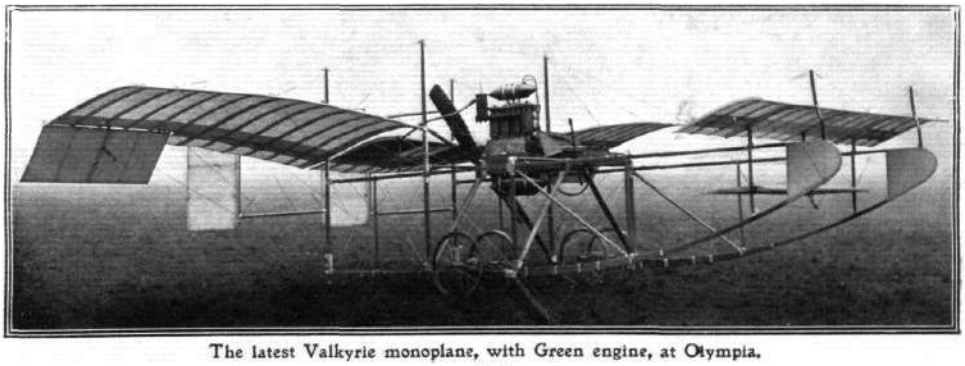
An interesting constructional detail on the latest Valkyrie, showing how the main wing guy-wires are anchored to a solid steel forging that can be detached as one piece from the principal strut. It is a feature of the Valkyrie design that none of the guy-wires are bent at the point of fastening.

Valkyrie (THE AERONAUTICAL SYND., LTD.) (STAND 69).—The latest Valkyrie monoplanes differ somewhat in appearance from their prototype in being lower in overall height. The general design and construction, however, remain much the same and they are still of the tail first type and of distinctly British design and construction. Among the interesting minor constructional features is the method of bracing by wire without bending the wire at the extremities.



The latest Valkyrie monoplane, with Green engine, at Olympia.

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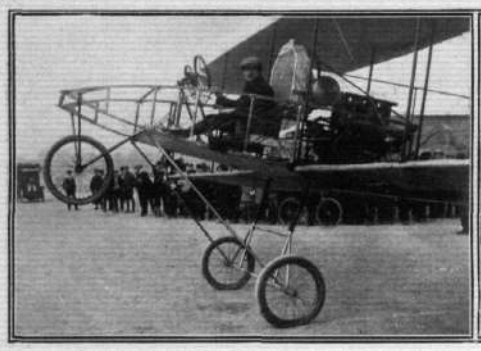
ENGINES.

The "A. B. C." (STAND 10).—This engine is made by the "All British" (Engine) Co., Ltd., Redbridge, Hants, and, as its name implies, is manufactured throughout in Great Britain. There are three different types, the 40-h.p., the 60-h.p., and the 120-h.p.; the 40-h.p. having four separate vertical cylinders with a bore and stroke of 4¾ ins. by 4¾ ins. and the weight complete with all accessories, but without fly-wheel, being 185 lbs. The fly-wheel weighs 20 lbs. The 60-h.p. is an 8-cylinder V type engine, with the cylinders set at 90°, which, of course, gives equal firing intervals. The bore and stroke are the same as in the 40-h.p. The weight complete is 275 lbs., or with fly-wheel, 18 lbs. extra.

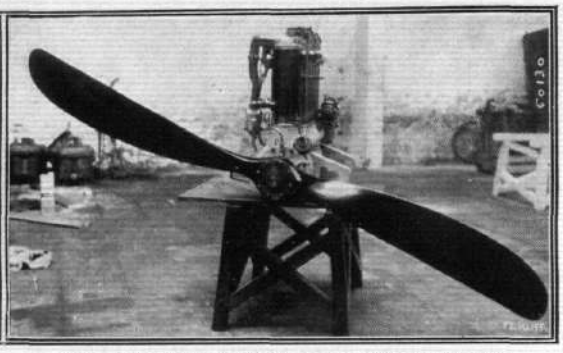
The 120-h.p. engine differs only from the 60-h.p. in the number of cylinders, which in this case is twelve. The weight complete is 400 lbs., and that of the fly-wheel 16 lbs.

The cylinders are made of cast-iron, specially strengthened with steel belts, by which method of construction it is claimed that the lightness associated with steel cylinders is obtained without their drawbacks. The water-jacket is composed of a seamless spun copper sleeve, corrugated to allow for expansion and contraction, and secured and made watertight by means of steel shrinking rings.

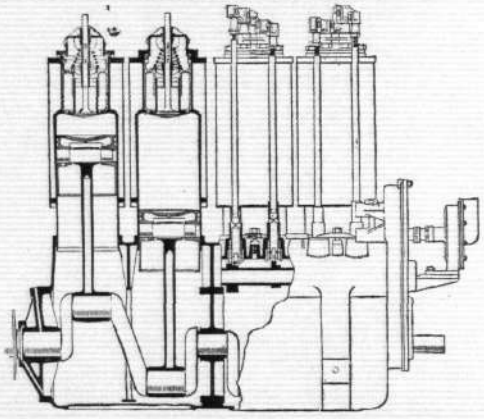
Dansette-Gillet (Exhibited by the GENERAL AVIATION CONTRACT CO.) (STAND 19).—These engines are made in three types of the same design and the same external appearance. The cylinders are vertical and separate, and are machined from solid steel. Separate copper water-jackets to each cylinder. Valves in the cylinder-heads operated by tappets. Lubrication forced by pump under pressure to all bearings. Ignition by high-tension magneto. The 32-h.p. engine has a bore and stroke of 98 mm. by 135 mm. and weighs 176 lbs. and develops 32-h.p. at 1,250 r.p.m. The 45-h.p. has a bore of 105 mm. and a stroke of 160 mm. and develops its nominal power at 1,200 r.p.m. It weighs 242 lbs. The dimensions of the



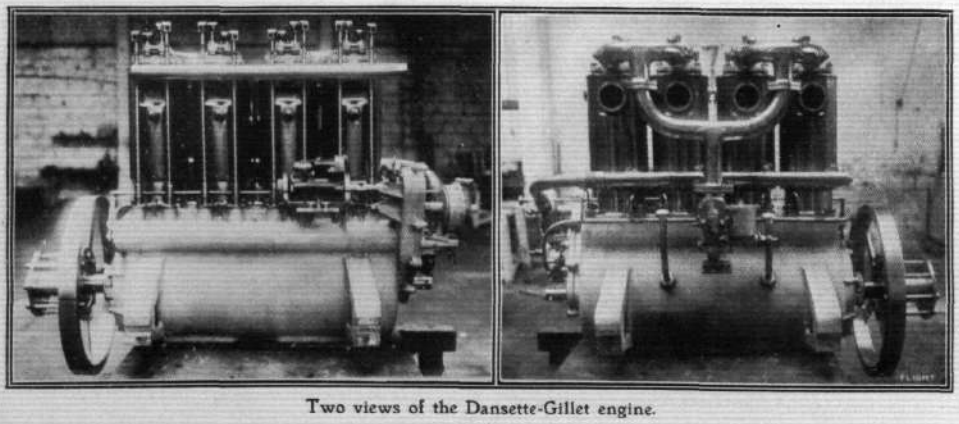
A Dansette-Gillet engine on a Voisin biplane.



View of the Dansette-Gillet engine with its propeller.



DANSETTE-GILLET ENGINE AT OLYMPIA.—Sectional drawing.



Two views of the Dansette-Gillet engine.

70-h.p. are 130 mm. bore and 160 mm. stroke, weight 330 lbs., and normal revolutions 1,100. The weights given above include magneto, carburettor, water and oil-pump and all pipe work. The speeds quoted are not intended to represent the maximum, the makers claiming that the engines can be safely run at far higher speeds.

The cross-sectional drawing represents the 70-h.p. motor, type C, in elevation. It is of the 4-cyl. vertical type, and develops 65-h.p. at 1,100 r.p.m., and will turn at 1,050 r.p.m. a screw of 2·7 metres diameter and 1·75 metres pitch. The weight is 150 kilogs. In working order, with radiator and water, the weight is 190 kilogs. A consumption of 250 grammes of petrol and 45 grammes of lubricating oil per horse-power hour is guaranteed. The inlet-valves and exhaust-valves are concentric, that is to say, the inlet-valve is mounted in the exhaust-valve and takes its seat upon the latter.

A 6-cyl. dirigible engine of the same general description as the 4-cyl. flight engine illustrated by the drawing is also constructed. It has an aluminium base-chamber in two pieces, so arranged as to permit the lower half to be removed. Lubrication is effected on the same pressure system, but the oil-ways are cored in the crank-chamber. The weight of the motor alone is 225 kilogs.

E.N.V. (THE E.N.V. MOTOR SYNDICATE, LTD.).—Though not directly represented at the Show, these engines are to be found on several machines exhibited there and are deserving of mention in view of the undoubted success scored by them during the past twelve months. They are made in three types, the 35-h.p., the 60-h.p. and the 100-h.p. Below we give a brief description of their characteristic features.

The 35-h.p. has eight cylinders with a bore and stroke of 85 mm. by 90 mm., arranged in V form, at an angle of 90°, which are attached to a crank-case of aluminium cast in one piece to ensure rigidity. The crank-shaft is supported on six ball bearings with double thrust at one end, to take the pull or push of the propeller when fitted direct to the shaft. The cylinders are of cast iron, machined inside and out, and have electrically-deposited water-jackets. The valves are made of a special material to prevent pitting. The single cam-shaft operating all valves is machined out of the solid, and is carried on ball bearings at each end with two intermediate plain bearings. High-tension magneto ignition is fitted as standard. Lubrication is pressure-fed by a force-pump, which is actuated by an eccentric on the crank-shaft. The carburettor is of the Zenith type. The weight is 166 lbs., including all accessories with the exception of the radiator.

The 60-h.p. only differs from the 35-h.p. in the dimensions of its bore and stroke, which are 105 mm. by 110 mm., and, of course, the weight, which is 310 lbs., with accessories, and in the fact that a White and Poppe carburettor is fitted.

The 100-h.p. E.N.V. has a bore and stroke of 130 mm. by 150 mm. and weighs 525 lbs. approximately. The valves are of the overhead type, actuated by pull rods. The ignition is by two entirely different systems, magneto and coil. In other respects the description of the 60-h.p. E.N.V. applies to the 100-h.p.

The Gnome (STAND 47).—These famous engines may be seen on the machines exhibited by the British and Colonial Aeroplane Company, who are the sole British agents. There are two well-known types of this engine, the 50-h.p. and the 100-h.p., the former having seven cylinders arranged radially round the crank-chamber in one vertical plane and the latter having fourteen cylinders arranged in the same manner in two planes.

There is also a 70-h.p. Gnome rotary engine fitted to the Blériot two-seater, which, is, so far as we are aware, a newcomer to this country.

These engines are, of course, too well known to need any but the briefest reference, and we will therefore confine ourselves to the following few remarks. The special feature of the Gnome engines is, of course, that the crank-shaft remains stationary whilst the cylinders themselves revolve. All cylinders are machined from solid steel, in fact, nothing but steel is used throughout, and most of the metal is forged nickel steel. No castings whatever are employed and aluminium does not enter into their construction in any shape or form.

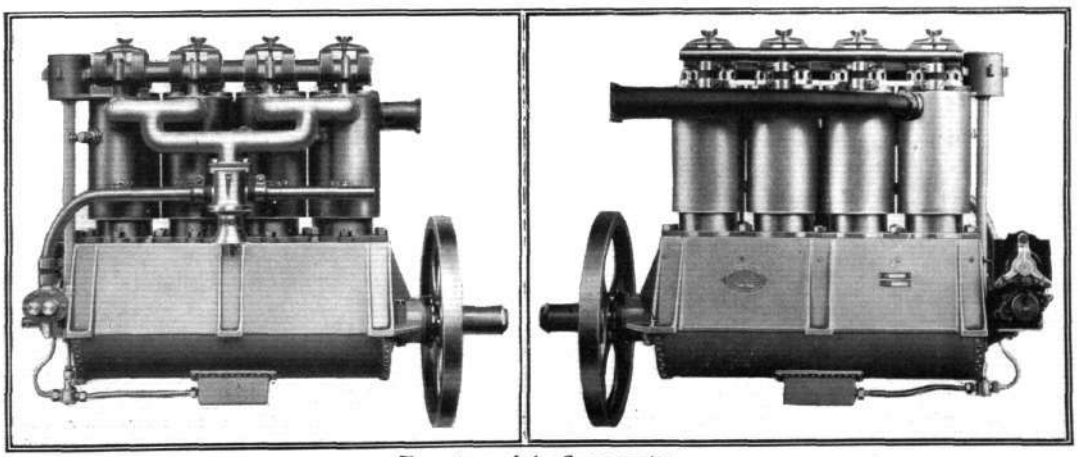
The inlet valves are situated in the piston-heads and are neat and compact valves of the mushroom type, balanced against centrifugal force by small counterweights and normally held on their seats by flat steel springs. The entire valve and its cage can be very readily removed.

The bore and stroke of the 50-h.p. and 100-h.p. rotary motors are 110 mm. by 120 mm. and the normal revolutions 1,200. The 50-h.p. 7-cyl. engine has a stated weight of 167 lbs., while the 100-h.p. 14-cyl., which, in principle, consists of two 50-h.p. motors coupled together, but with the valve mechanism all transferred to one end, has a stated weight of 220 lbs.

Green (GREEN'S MOTOR PAT. SYN., LTD.) (STAND 31).—These engines are made in two types, the 30–35-h.p. and the 50–60-h.p. Both are 4-cyl. vertical engines with the cylinders mounted separately.

The engines are practically the same as at the last Olympia Show, the improvements and innovations being in minor details, such as slightly heavier valve stems, larger oil pumps, &c. An innovation in the case of the larger engines, which Messrs. Green fit to order, is that of auxiliary exhaust-ports, by which a greatly increased power may be obtained; the 50–60-h.p. model, for instance, has developed as much as 85-h.p. These engines, as our readers are aware, have many notable achievements to their credit, for they hold the British record both for distance and endurance, have won the British Michelin Cup twice, and the longest flight ever made in Great Britain was accomplished with the aid of one of these engines.

N.E.C. (NEW ENGINE (MOTOR) CO.) (STAND 65).—The new 50-h.p. two-stroke N.E.C. engine is exhibited by this firm. It will be remembered by readers of FLIGHT that it was with an engine of this type that Mr. Alec Ogilvie performed so creditably in his attempt to win the British Michelin Cup.



Two views of the Green engine.

It is of the 4-cyl. "V" type and capable of developing 50-h.p. at 1,250 r.p.m. It is water-cooled and has cast iron cylinders with electrically-deposited copper water-jackets. The bore and stroke are 3⅛ ins. by 4½ ins. respectively, and the weight complete is 150 lbs., or 3 lbs. per horse-power.

The point of special interest in this engine is the means employed for the complete scavenging of the cylinders between each firing stroke, for it is in this direction that the orthodox type of two-stroke engine proves lacking in efficiency. A special form of "Roots blower," which is a kind of centrifugal fan, is used for this purpose and is divided into two parts, one part dealing exclusively with fresh air, which is pumped into the cylinders immediately after the completion of the firing stroke, so scavenging out the exhaust gases, and the other part delivering an explosive charge into each cylinder in turn at a predetermined instant of time.

Renault (STAND 39).—The 50-60-h.p. engine exhibited is of the type that carried off the last Michelin Cup. The general arrangement is well known. The eight cylinders are arranged in V form. The valves are of the overhead type, controlled, one directly and the other by an overhead cam-shaft. Ignition is by magneto, turning at the speed of the motor, and lubrication is by interior oil circulation, without forced feed.

An interesting characteristic of this motor is the fact that the propeller is attached to the cam-shaft, which is constructed specially strong for this purpose, and not to the crank-shaft. The propeller, therefore, turns at half engine speed.

The cooling is effected by the use of a centrifugal fan, which forces a strong current of air into the chambers formed by the cylinders and the casing which covers them. This system has been found entirely satisfactory in practice.

Wolseley (WOLSELEY TOOL AND MOTOR CAR CO., LTD.) (STAND 51).—Constructed in two types, the 120-h.p., suitable for both aeroplanes and dirigibles, and the 60-h.p. Both have eight cylinders arranged in V form, and are practically identical in the system of construction. The 120-h.p. model has a bore and stroke of 5 ins. by 7 ins., and the corresponding dimensions of the 60-h.p. are 3¾ ins. by 5½ ins. The following particulars apply to both types:—

The cylinders are cast separately and mounted at an angle of 90° on an aluminium crank-case. The cylinder-jackets are of spun aluminium, screwed and jointed to the combustion heads, the bottom joint being made by means of a dermatine ring. Mechanically-operated valves are employed, controlled by means of a single cam and rocking-lever—this rocking-lever is operated from the cam-shaft by means of a plunger and tappet-rod. Gears and cam-shaft are totally enclosed. Ignition is by Bosch dual system. Water circulation is maintained by means of a positive-gear pump.

Lubrication is of the forced system in which oil is continuously circulated by rotary pumps, one pump drawing oil from a separate tank and forcing it to all important bearings. The other pump draws oil from the crank-chamber and returns it to the separate oil tank. The gudgeon-pins and cylinder walls are lubricated by splash. Try-cocks are fitted where necessary and oil-pressure gauges are fitted.

The weights are approximately 580 lbs. for the 120-h.p. and 300 lbs. for the 60-h.p., including, in both cases, the magneto, wiring, plugs, all water-pipes on engine, water-pump, oil-pumps, piping and connections, but not the fly-wheel.

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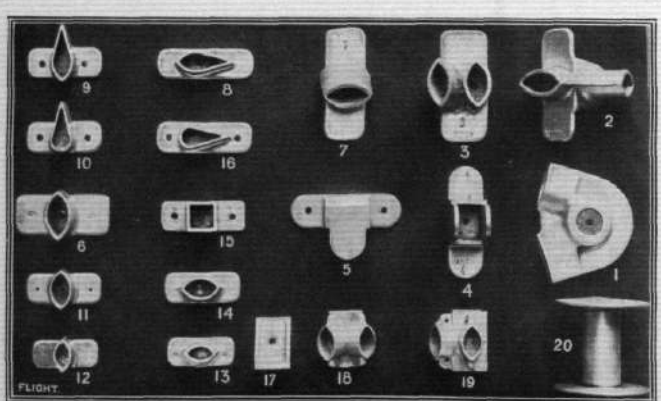
ACCESSORIES.

Aerial Engineering Works, of Calbourne Road, Balham (STAND 3), have on view flying models and scale models, also model engines of ¼-h.p. to ½-h.p., also "Fairy" high-flying monoplanes and propellers, as well as the Chinnock direct-lift machine (not a helicopter), an experimental model. In addition a full-sized 7 ft. 8 ins. Chauviere tractor suitable for an Anzani-Blériot.

Aeroplane Supply Co.—the Aviation Section of the MOTOR SUPPLY CO.—(STAND 2), besides showing the well-known "Asco" propellers, have a very large assortment of "Asco" British-made accessories and parts, including aluminium lugs, wire strainers, piano wire, shock absorbers, wheels and tyres, fabric, &c.

A corner of this exhibit is devoted to the booking of passenger flights at Brooklands or Hendon, and also for business connected with the aviation schools at Hendon. Special terms are being arranged for naval and military officers desirous of obtaining the Aero Club pilot's certificate in order to comply with the new Army regulations concerning the Air Battalion.



An excellent assortment of "Asco" aluminium lugs.

Allen, Knight and Co., Ltd. (STAND 33), exhibit a very fine collection of aeroplane models.

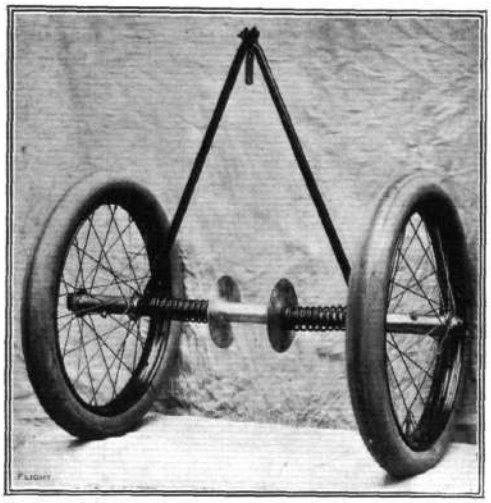
The exhibit comprises models of all the best-known types of monoplane and biplane. They are also showing all kinds of model accessories, such as wheels, propellers, special waterproof silk for both models and full-size machines.

Messrs. Allen, Knight and Co. are also showing "Marlboro'" and "Beney" propellers, and samples of the workmanship which they put into their full-size machines.

Almagam, Ltd., THE NEW MOTOR AND GENERAL RUBBER CO. (STAND 37), are showing rubber goods, such as aeroplane tyres, shock-absorbers, and acid resisting tubes, suitable for conveying petrol and lubricating oil under pressure.

Blackburn Aeroplane Co. (STAND 45), show a large assortment of aeroplane accessories, in addition to their other exhibits. These consist of different sizes of wheels for

Two "Asco" propellers by the Aeroplane Supply Co., Ltd.



A pair of "Asco" running wheels of the Farman type.

running chassis, and a variety of wire strainers, eye-bolts, wire clamps, &c. Aluminium castings and pressed steel engine brackets are also shown.

Brown Bros. (STAND 18) are this time making a special feature of small tools, lathes, &c. They are also showing a variety of small fittings, including aluminium lugs and sockets, wire strainers, &c. An interesting little fitting is the "Tingye" sparking-plug cut-out, which can be fitted to any make of plug. The operation of this device is clearly shown in the accompanying sketch.

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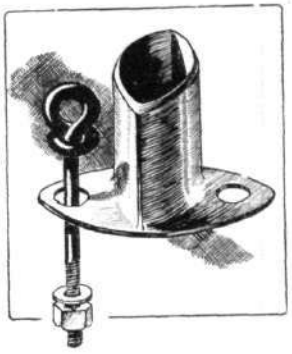
Sketch showing the application of the "Tingye" plug cut-out recently placed on the market by Messrs. Brown Bros.

T. W. K. Clarke and Co. (STAND 17), show many very interesting specialities. These consist of some new welded steel sockets, which are unbreakable, and lighter than cast aluminium sockets, the special Clarke type wire strainer, that is both light and simple and cannot slip. Other specialities consist of broad-hubbed landing wheels with steel or wood rims, the Clarke adjustable shock-absorber, and a 12 ft. 6 in. propeller for a dirigible. They are also showing samples of wing construction, a quarter full-sized power model of the Clarke monoplane, and an extensive selection of materials for model-making.

Ding Sayers (STAND 6) are showing several of their well-known "Ding Sayers" model aeroplanes and also many useful model accessories by J. Bonn and Co., whose excellent specialities are also to be seen on many of the models exhibited at this Show.

Eyquem's Patents (HARRIS AND SAMUELS) (STAND 34), have a large assortment of aeroplane accessories, both for full-sized machines and models. The above firm are specialising in very light and strong running wheels. They are also showing aviators' helmets, aeroplane seats, engine beds, castings for air-cooled engines and a new, very strong aluminium alloy, called Sulphalium, which is only 2½ per cent. heavier than aluminium, and is capable of withstanding sea water without any ill effect. A number of Rhineland R.M.C. ball bearings are also shown.



"Flight" Copyright.

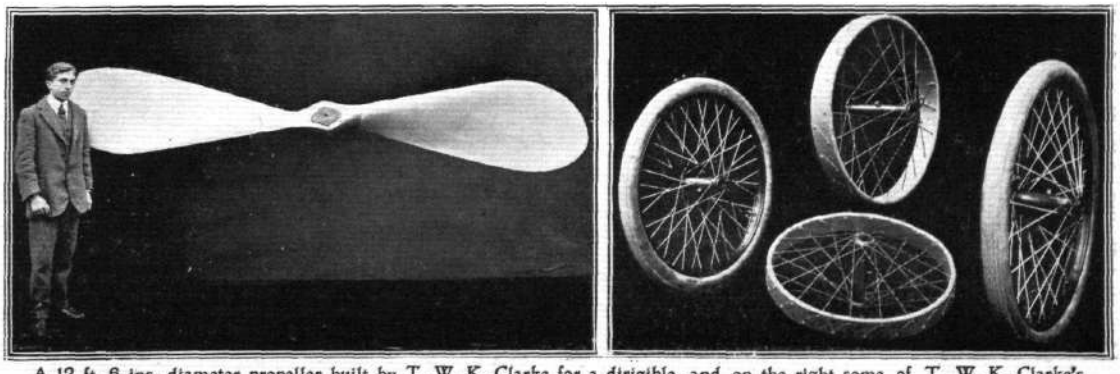
A steel socket and bent steel eye-bolt, by T. W. K. Clarke and Co.

General Aviation Contract Co. (STAND 19), who are staging the Dansette-Gillet engine, are also exhibiting the "R.F." propellers, manufactured by Regy Frères, "Hue" aeronautical instruments, and "Vigilax" automatic statoscopes, barometer, altimeter, recording altimeter, "ascent and descent" altimeter, compass, anemometers, manometers, pocket instruments, complete outfits for use with aeroplanes, balloons and dirigibles.

Handley Page, Ltd. (STAND 73), show a complete and very exhaustive display of aeronautical accessories, including wire strainers, eyebolts, wire clamps, bolts and nuts, high-tension aero stay wire, pulleys, wheels, aluminium sockets, and many of the thousand-and-one details that are required in building an aeroplane. Some of the new type "H.P." registered design propellers, from which some very high efficiencies have been obtained, are also shown.

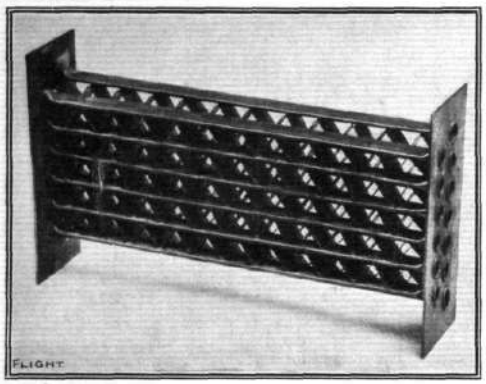
These accessories are similar to those supplied to H.M. Balloon Factory.

Henry Hughes and Son (STAND 104), the well-known opticians, exhibit numerous useful instruments, such as chart instruments, sextants, aneroids and compasses. The latter are of a special type, and should be most useful for aviators.



A 12 ft. 6 ins. diameter propeller built by T. W. K. Clarke for a dirigible, and on the right some of T. W. K. Clarke's special broad-hubbed running wheels.

Imperial Motor Industries, Ltd. (STAND 15), exhibit a display of the R.W.F. ball bearings—for which the above firm are the sole agents—that have been largely taken up by makers of aeroplane engines. They are also showing alarm signals of every description, and a large variety of tools.



Section of the Lamplough aviation radiator, which consists of rows of flat tubes with corrugated strips of metal between them.

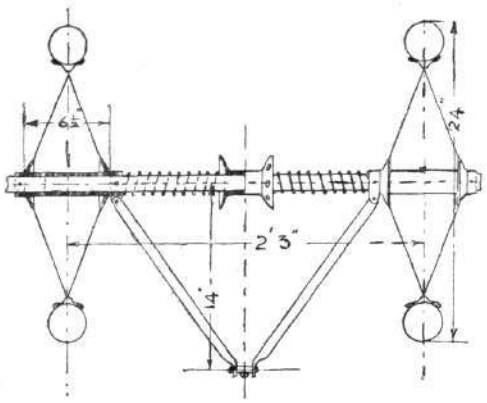
Lamplough and Son exhibit on Stand 28 the Lamplough-Albany radiators, as used by many of the leading aviators; and the new Willesden-Albany aviation pump, a specially light, high-speed, valveless rotary positive lubricating pump, capable of being run at very high speeds and weighing only a few ounces, although strength has not been sacrificed to lightness, which is borne out by the fact that pressures of 300 lbs. per sq. in. have been obtained. Also the latest type of auto-terminal sparking plug, the connections of which cannot be dislodged by vibration, as often occurs when the screwed or sliding types of terminals are employed.

Leo Ripault and Co. (STAND 36), show a number of useful accessories for aeroplanes, such as the well-known "Oleo" aviation plugs, as used by many of the leading aviators; C.A.V. electric searchlights; and H.B. light motors.

Richard Melhuish, Ltd. (STAND 41), have set out a large variety of tools, fittings and machinery of the kind necessary for the manufacture of aeroplanes, among which may be mentioned the following:—Aeroplane strip wire and strainers, new pattern screw-cutting lathes, bench planing and shaping machines, high-class precision gauges and tools, new pattern work benches, sheet metals and rods, benzoline melting furnaces. Under the last category may be included a new paraffin forge of exceptional heating capacity. Pressure is obtained in the tank by means of a pump, and the working pressure can be regulated irrespective of the tank pressure. At full heat an intensely hot flame is given 14 ins. wide and 18 ins. high.

Mossley Hill Motor Car Works (STAND 12), exhibit the Gibaud magneto for use on aeroplanes and other electric ignition accessories. The feature of the Gibaud magneto is the distributor, which consists of a sun-and-planet gear, in place of the usual two-to-one gear.

A. V. Roe and Co. (STAND 29). Here will be found an excellent assortment of accessories and parts for aeroplanes. The following is a list of the principal exhibits:—Propellers and tractors, various types; length of body showing "Avro" castings for triangular body; "Avro" wheels mounted on short length of skid; spares for various recognised types of aeroplanes; struts in spruce, hickory, ash and mahogany, &c.; ribs, built-up and otherwise; bamboo; aluminium sockets for various kinds of aeroplanes; bolts, eye-bolts, eye-plates, strainers, &c.; "Avro" wire—plain, stranded and flexible; steel springs and rubber shock-absorbers;



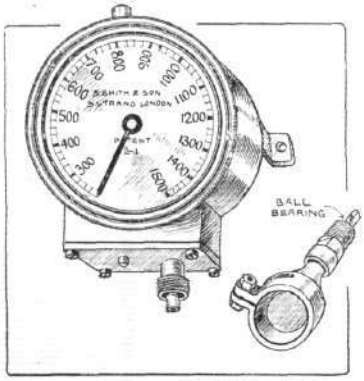
An Avro aeroplane axle at Olympia.

rubber cord; samples of various aeroplane fabrics; tanks, sparking plugs, switches and other engine accessories; photos of pupils flying the Avroplane; lantern slides of models and Avroplanes being built and flying, &c.; blue print of the latest "Avro" biplane.

Simms Magneto Co., Ltd. (STAND 38), are showing the following, all British ignition specialities:—(1) Working models for 2-, 4- and 6-cylinder machines; (2) Working model of the dual ignition type "A"; (3) Working model of the dual ignition type "S"; specially light magnetos for aero work; together with magneto covers, sparking plugs, distributors and various other ignition accessories.

S. Smith and Son (STAND 98). Many useful accessories are to be found on S. Smith & Son's Stand, including a special compass for aeroplanes, aneroid barometers and revolution indicators. Special self-registering altitude recorders of various sizes, and the Goldenlyte projectors are also shown.

Spiral Tube and Components Co. (STAND 30) exhibit their well-known spiral tube radiators, as used by Mr. Tom Sopwith in the De Forest contest, and in the test made of the 30-h.p. Green engine at Teddington, when this engine ran for 24 hours without stopping, the ordinary spiral tube radiators losing only 3 lbs. of water during the whole period. The weight of these radiators has now been got down to ½ lb. per horse-power; 15 lbs. of water is sufficient for cooling a 60–80-h.p. E.N.V. engine, the weight of the radiator in this case being about 30 lbs.



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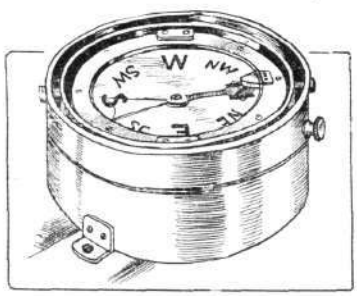
A revolution counter by S. Smith and Son of the Strand.



"Flight" Copyright.

One of S. Smith and Son's aeronautical compasses.

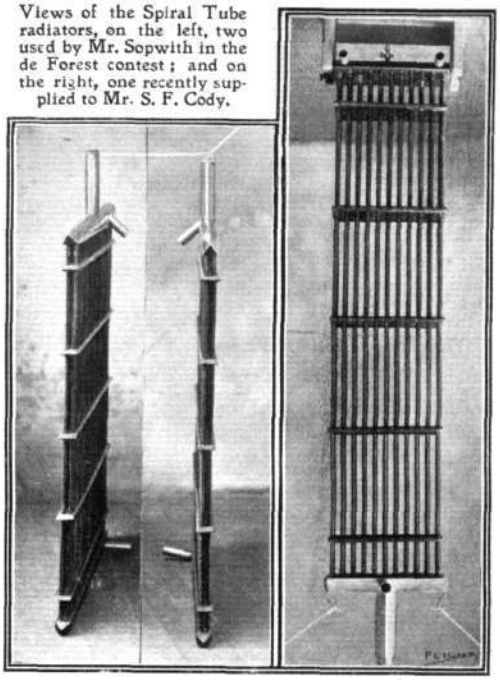
Stern Sonneborn Oil Co., Ltd. (STAND 35) are showing the following specialities :—" Staerol " oils for aeroplanes, Motosternol oil for water-cooled cylinders of motor boats, Stern's electric motor oil, Sternoline motor grease, Clutcholine for metal or leather clutches, Sternoline metal polishing paste, Sternol liquid metal polish, Sternvale burning oil for lamps, Stern's patent dustproof Stauffer motor lubricators, Stern's spring lubricator, light make.

Weston, Hurlin and Co. (STAND 24) are showing various samples of aluminium fittings and sockets, extra light steel tubing, eye-bolts, strainers and woodwork for gliders and full-sized machines. They are also showing a full-sized model of the " Ingram " paddle propeller, and several W.H.C. type laminated propellers.

FABRICS.

Dunlop Rubber Co., Ltd. (STAND 56).—Have as a leading feature a balloon made of the new Dunlop fabric by Messrs. Short Brothers. Besides fabrics for both ordinary and dirigible balloons, there is a comprehensive collection of aeroplane materials possessing special qualities. Aviators' outfits are also conspicuous, and amongst other garments will be found a leather combination suit, water-proof jackets and overalls, Harris tweeds, and caps to protect the entire head. Aeroplane tyres, wheels, and rubber shock-absorbers are other items in a display that will be found full of interest.

North British Rubber Co., Ltd. (STAND 26), exhibit a full-sized aeroplane wing made up of various North British fabrics, six in number, actually fitted to the wing in sections. In addition are shown balloon fabrics and a full-sized balloon suspended from the roof, the envelope of which is made of " North British " fabric. This was the first spherical balloon to be made and put into use constructed of all-British indiarubber-proofed cloth and was made for Mr. Norton Griffiths, who loaned it to the Chilian Government for ascents to be made in connection with the Chili Centenary Fêtes. The exhibit also includes aeroplane tyres, and footwear suitable for aviators as well as motor boating suits, &c.



Views of the Spiral Tube radiators, on the left, two used by Mr. Sopwith in the de Forest contest; and on the right, one recently supplied to Mr. S. F. Cody.

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The Isaacson Engine at Olympia.

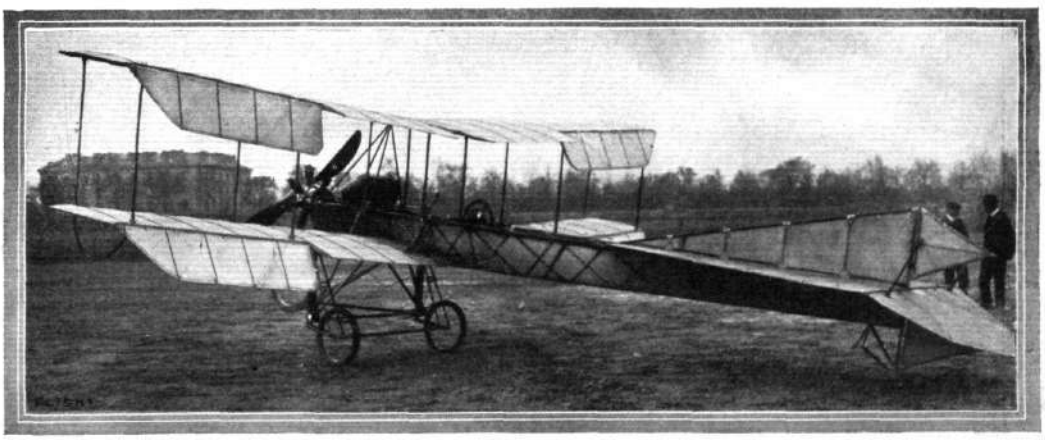
So many inquiries have been made for particulars of this cleverly designed engine that Stand No. 22, where it will be on view at Olympia, is likely to be one of the centres of attraction. Our readers are invited to inspect it there, and in an early issue of FLIGHT its special features will be dealt with.

"Flight Fittings."

SUCH is the title given by Messrs. T. W. K. Clarke and Co. to the latest edition of their very complete catalogue. It contains particulars and prices of practically everything required by the builder of aeroplanes, either in the way of materials, fittings or accessories. It also contains full particulars and prices of the Clarke propellers. Wherever possible various fittings are illustrated, while examples are given of fabrics. It is, in fact, one of the most comprehensive lists in connection with the flying industry that we have yet seen.

An Aero Cab Service for Liverpool.

MESSRS. BLÉRIOT, LTD., of Long Acre, have just sold a Blériot two-seater monoplane to a gentleman who is going to start a regular passenger service near Liverpool. This, it is claimed, will be the first " Aerocab " service to be started in this country.



MM. Dufaux Frère's Gnome-engined Swiss biplane, which the constructors have recently taken to Issy for practice work. The surface is 44 square metres; weight 300 kilogs.

FOREIGN AVIATION NEWS.

At the R.E.P. School.

ON the 17th inst., Capt. de Chaunac was flying on the "Oiseau Rouge," a military R.E.P., for three-quarters of an hour, during most of which time he was over the country. Capt. Cammines, who is learning to fly an R.E.P., was up for 10 mins. at his first attempt on the 17th inst., and at a second trial he was in the air for 20 mins. On the same day Prince de Nissole left the Buc Aerodrome to fly to Etampes, but he landed at Trezan, close to Malesherbes, in the evening.

At the Sommer School.

ON Saturday, at Douzy, Molla spent considerable time testing two new biplanes for the French Army and was in the air for 4¾ hours, although a strong wind was blowing. The aeroplanes were accepted by the Military Authorities and the builder was awarded a bonus of £112. Molla afterwards made a flight of half-an-hour's duration with Lieut. Girard as passenger. Robinet was also flying for 1 hour, while Bathiat made four trips on his monoplane. On the previous day Bathiat on Kimmerling's monoplane, flew through a snowstorm from Douzy to Mouzon and back.

A Good Flight by Parent.

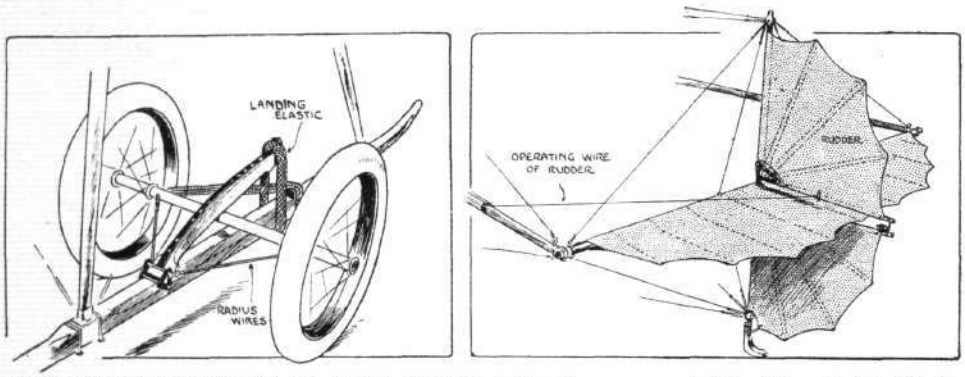
ON Saturday at Issy, Parent on his monoplane carried Henry Poulain as a passenger for 47 mins., during which his average altitude was 60 metres. There were also a large number of aviators, including Anzani and Mdlle. Trany, practising on the ground and practically all of them were using monoplanes of various types.

Across Country on a Nieuport Monoplane.

AN excellent cross-country flight was accomplished on Sunday last by Lieut. Philippe Fequant, who, accompanied by Lieut. de Briey, and mounted on a Nieuport monoplane of the military type, flew from Mourmelon to Rheims, rising at times to a height of 600 metres.

Pau to Biarritz.

ON Sunday afternoon, Capt. Bellenger and Lieuts. de Rose, Malherbe, Conneau, and Princeteau determined to fly over to Biarritz. Princeteau and Malherbe did not, however, get very far before deciding to turn back, and Lieut. de Rose had to land at Orthez, but the others went on and safely landed at Biarritz, where they were entertained to dinner in the evening by the local Aero Club.



PAULHAN'S NEW MACHINE.—On the left, sketch illustrating the arrangement of the skid on the latest Paulhan biplane; and on the right is seen the rudder. This is made in two sections, which admits of the fabric being kept tight by a simple connection, and the position of the horizontal plane can be varied by adjusting the stays of the vertical rudder post.

Proposed Flight from Paris to Rome.

IN connection with the Exhibition to be held at Rome it has been proposed to organise a race from Paris to Rome, the route suggested being *via* Paris, Lyon, Valence, Marseilles

PAULHAN'S NEW MACHINE.—It will be noticed that in addition to minor changes, M. Paulhan has abandoned the Fabre lattice type of construction for the main spars of his machine.

Nice, and Pisa. At the time when the late M. Delagrange paid his visit to Rome in 1908 it was then suggested that some of the French aviators might visit the Exhibition *en aeroplane*, although at that time it hardly seemed possible that such a thing would be feasible.

Wilbur Wright in France.

IN connection with the lawsuit which is now proceeding in France over the Wright patents, Mr. Wilbur Wright is paying a short visit to Europe. He left New York on the 14th and arrived in Paris this week.

Baron de Caters Returns from India.

BARON DE CATERS, accompanied by the Belgian aviator Tyck, has returned from their journey to India and the East. Baron de Caters is paying a visit to Nice, but Tyck has proceeded to Antwerp where he is resuming his business of teaching flying.

How Busson carried his four passengers on his Deperdussin monoplane

More Aeroplanes for the German Army.

ON the 16th inst. three German officers paid a visit to the Albatross works in order to take over the three Farman biplanes which have been built there to the order of the German Army. Each of the officers, Lieuts. Mackenthum, Dunar, and Foester, made trial flights, the last-mentioned in landing damaging the chassis of his machine but fortunately escaping injury himself.

Aix-la-Chapelle to Berlin Event Postponed.

THE Committee which has been organising the cross-country race from Aix-la-Chapelle to Berlin has come to a decision to postpone the event until next year, when it will probably take place between April 27th and May 21st. This action has been taken at the suggestion of the German Minister for War, who apparently does not like the idea of the possibility of any airmen straying above the forts.

German Gordon-Bennett Eliminating Trials.

IN view of the postponement of the Aix-la-Chapelle to Berlin event, the German Aviation Federation has decided to entrust the Aero Club of the Lower Rhine with the organisation of the eliminating trials for the Gordon-Bennett Cup. They will probably be held at Cologne between the 6th and 10th of May, and prizes valued at about 30,000 marks will be offered.

From Antwerp to Breda.

ON the 17th inst., Count D'Hespel and Lieut. Coblyn, of the Dutch Army, succeeded in flying from Antwerp to Breda. They came down on the way at Dongen in order to make an adjustment to the motor, and in landing one of the skids was damaged. This, however, was with ease repaired sufficiently to allow the machine to continue on its way.

A Scandinavian Cross-Country and Over-Seas Flight.

THE Swedish aviator, Baron Cederstrom, has announced his intention of making a circular trip from Copenhagen across the Sound to Malmoe and then on to Landserona, Helsingborg, Elsinore, and back to the Danish capital. Baron Cederstrom has also arranged to give exhibition flights in Norway at Christiania, Bergen and Dromthein.

Bouvier at Tunis.

ON the 15th inst. Bouvier was flying on his Goupy biplane at Tunis and passed over the town at a height of 800 metres. He was flying until quite late in the afternoon and, in fact, when he returned to the aerodrome it was quite dark. He was also out again on the Goupy biplane on Saturday, when he was flying over the town for over an hour.

The Aerial Post at Allahabad.

THE flying post established at the Allahabad Exhibition has proved to be very popular, and on one Saturday M. Piquet carried over 5,000 letters on his Humber machine from the Exhibition across the Jumna to Naini, the aviator himself signing forty postcards. At the Oxford and Cambridge hostel, which has been turned into a miniature G.P.O., the work of sorting the large number of letters for the aerial post lasted from 9 a.m. to midnight. M. Piquet last month duly completed the 30 hours' flying which he had agreed to do at the Exhibition by taking Mr. Murray for a trip of 19 mins. across country.

AIRSHIP NEWS.

The Naval Airship Ready for Launching.

ACCORDING to advices from Barrow, the Naval airship, No. 1, has now been completed, and only awaits a favourable spell of weather to make its appearance in the open. The officers and crew that have been appointed to the giant dirigible have been waiting anxiously at Barrow for some time to put the airship through her official trials.

Mr. Willows Leaves Watford.

AFTER being weatherbound at Watford for some time Mr. Willows decided to deflate his airship and convey it to Wolverhampton by rail. His stay at Watford was unfortunately marred by legal proceedings, as the local Town Council issued a summons against him for erecting a hangar without obtaining permission from them. The case was heard at Busbey on Tuesday, when, however, it was decided in favour of Mr. Willows. Mr. Willows hopes to be able to fly shortly from Dunstall Park, Wolverhampton, to Manchester, where a hangar is being erected in Trafford Park.

A Dirigible at Issy.

A STRANGE craft has been seen at Issy during the past two days in the shape of the Spanish dirigible, "Torres Quevedo," which, after undergoing some alterations and repairs, has made one or two trial trips. The envelope is 45 metres long and 10 metres across the widest part. A peculiarity of the gas-bag is that it is of trefoil shape in section. It has a capacity of 1,600 cubic metres. The 60-h.p. Chenu motor drives a single propeller at the front of the car.

Mishap to "Parseval VI."

WHILE being drawn out of its shed preparatory to a flight with a number of passengers, the German airship "Parseval VI" met with an accident similar to that which befel the *Morning Post* National Fund airship at Aldershot last year. The envelope came into collision with the shed and was ripped so badly that it collapsed very rapidly. Fortunately no one was injured, although the would-be passengers only narrowly escaped.

Austrian Dirigible Wrecked.

WHILE preparations were being made on Monday for a voyage from Linz to Vienna, in the Austrian military dirigible of the Lebaudy type, the dirigible was torn from her anchorage by a gale. The envelope was blown to the ground with such force that it was ripped up practically from end to end and the airship became a total wreck.

Argentina and International Flying.

A YOUNG native Argentine, who is at present successfully flying at Brooklands, is desirous of getting into touch with some other Argentine men who would care to interest themselves in aviation from a patriotic point of view. He, being fully capable, would like to represent the Argentine Republic in this year's big competitions. We shall be very happy to put any of our readers into communication with him upon receipt of a letter addressed to "Argentine," care of the Editor of FLIGHT.

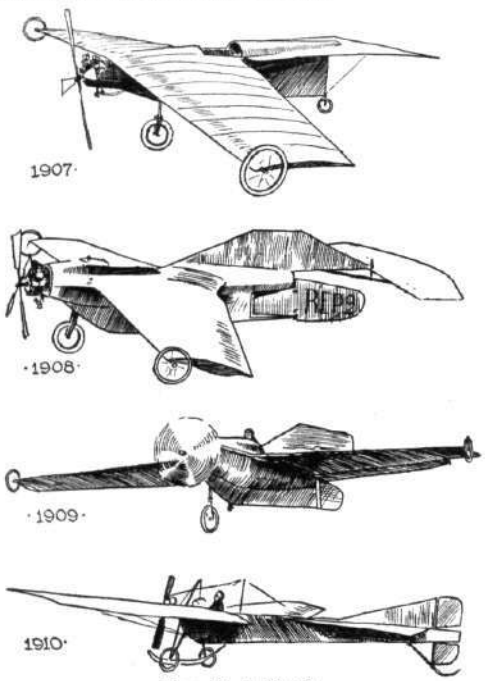
PROBLEMS RELATING TO AIRCRAFT.

By MERVYN O'GORMAN.

(*Continued from page 234.*)

34. **Side Gusts.**—Side gusts introduce difficulties of their own. A machine which is Veed between the wings, and which has its wings mostly above the centre of gravity, is clearly liable to be tilted over by a side wind, the remedy for which is a fin, or keel. It is clear that the area of the vertical fin should approximately equal the projected area—(on elevation) of the wings, &c.—and that the centres of pressure should come opposite one another, and the same distance from the axis.

A good instance of the successful application of this idea is Ding's model monoplane, of which an example is on the table. It is of type S, and though it of course moves bodily with a wind, it is not upset by side gusts. Its range is about 400 yards, and its speed about 20 m.p.h.



Figs. 10, 11, 12, 13.

The Development of the R.E.P. monoplane.

1907. Absence of top fin, inverted Vee.
1908. Vee still inverted, partial remedy by top fin.
1909. Inverted Vee very slight and larger top fin.
1910. Stable Vee, fin above centre diminished.

35. **Evolution.**—In the above series of four pictures of the Robert Esnault-Pelterie planes for 1907, '08, '09 '10, an example is given of the evolution of an airman's ideas. Here it is shown how the fins were adopted when they were wanted, and abandoned when the rest of the design provided an equivalent feature.

In the first, in 1907, the machine is very short from nose to tail (Fig. 10). The wings are set to form an unstable Vee, *i.e.*, there is an inverted dihedral angle. The mechanical advantage obtained from this is the absence of the "cabane" over the airman to take the pull of the wings when the machine strikes the ground (though he had to adopt this in 1910); the tail plane is curved to get some lift out of it, and wing-warping and a tail elevator are used. It is Class B. It is a perilous machine and barely flies.

36. In the second machine, 1908 (Fig. 11), the designer adds a large vertical fin at the back of the pilot—as is necessary for lateral stability with his inverted Vee to the main wings, and because of side gusts. Note that the machine, though still rather short and stubby—like a seagull—is longer than that of 1907, by the fact that the dipping rudder has been rigged out beyond the steering rudder, while it is also less curved.

37. In the third machine, 1909, (Fig. 12) we appear to have the same features, but the back fin has been made larger still. It will be seen that M. Esnault-Pelterie is rapidly learning and using his knowledge. He sees that there are difficulties with lateral stability when the main wings are set downwards, as he sets them, and failing to overcome these difficulties with fins, next year he quits this plan.

38. In the fourth aeroplane, 1910 (Fig. 13), the dihedral angle, the proper Vee between the wings, is frankly adopted, and now he can and does abandon most of the vertical fin *above* the body. Whether he may find it useful to have a small vertical fin *below* the body to render the side elevation symmetrical about the centre of gravity is for the future to show. At any rate, he nearly has the equivalent of it by means of the covered boat body, which comes well down. We can notice that his ideas about propellers alter, and that he abandons the four-blade for the two-blade propeller, and quits aluminium for wood.

39. **Extending the Range of Automatic Stability.**—Any Veed aeroplane flying on an even keel will by its inertia oppose resistance to one or other of its wings being rapidly lifted up; as a rule, the presence of an upsetting couple implies the existence of an excess of wind pressure on one wing, so that either:—

(*a*) The intensity of the loading per square foot of surface (generally about 3½ lb.) is increased sufficiently to accelerate the wing upwards, or diminished sufficiently to drop it; or

(*b*) The effective area of the wing is increased—as, for example, when the flap used for banking is pulled into the air stream by the pilot.

If the fabric of the wing were so made that it became a sieve as soon as a pressure of 3½ lb. per square foot was exceeded, any important increase of loading might be precluded, and stability thereby improved. It is not wise to say that such an arrangement is easy within the limits of weight, but it is not impossible. Thus, a series of silk slats, like a Venetian blind, could be spring-controlled, so as to be opaque to the wind until the spring tension is exceeded, when they would open and let the air through.

40. **Equalizing the Lift on the Two Wings.**—Looking into it further, we find that there is no merit in keeping the loading to a fixed limit such as 3½ lbs. per square foot, provided that any increased pressure is the same in both wings. That means that instead of a spring of definite strength, a pneumatic or other connection must be made between the two controlling spring tensions, so that the slats open when the wing pressures are unequal. This does not preclude the use of ailerons for banking.

Another suggestion is that hinged wing extensions should be held by springs which are *set up*, but which yield a large movement when the pre-arranged tension has been exceeded.

41. **Why a Flexible Trailing Edge and "Sloppy" Rigging is Used.**—This gives us an insight into the reason for the preference of some flying men, such as Wright and Farman, for a *sloppy* rigging of their machines, as against the rigid tightening-up of all wires. This will also, I surmise, be some day part of the justification for the use of tension wires artificially provided with a long elongation, either by inserting springs under the compression struts, or compression springs with a limited travel in the tension wires themselves or by the use of extensible wires such as stranded cables.

Equally the use of a flexible trailing edge to the main planes serves the same purpose, namely, that of relieving whichever spring may be temporarily loaded by a gust, or by a local up-draught beyond what the other wing is bearing. This diminishes the magnitude of the roll due to the local current, and delays its effect so that the airman can deal with it.

It is as well to say that it is the inertia of the machine which is being used in these devices, that is to say, the more sudden the movement the more efficient the scheme.

(*To be continued.*)

CORRESPONDENCE.

*** *The name and address of the writer (not necessarily for publication)* MUST *in all cases accompany letters intended for insertion, or containing queries.*

Correspondents communicating with regard to letters which they have read in FLIGHT, would much facilitate ready reference by quoting the number of each such letter.

NOTE.—*Owing to the great mass of valuable and interesting correspondence which we receive, immediate publication is impossible, but each letter will appear practically in sequence and at the earliest possible moment.*

The Gull's Tail.

[1116] Mr. Elliott's analogy of the paper model, in the question of the use or disuse of the gull's tail, seems to me to be beside the point, merely showing that it is possible for birds in general to make use of their tails.

This I do not for a moment doubt, for it is obvious to an observer that birds such as the pigeon, blackbird, &c., do so; but I contend that circumstances render the gull's tail extremely inefficient. For instance, its body slopes rather abruptly near the tail, spoiling the gently curving stream lines, and leaving the tail to a certain extent in "dead water."

The tail is rounded on top and bottom, thus making it less efficient.

The wings sloping back and the body being short, it must be very close to the centre of pressure and so cannot have much leverage. Other reasons will, no doubt, occur to Mr. Elliott, if he thinks about it, which apply in the case of this bird more than in that of most others. It seems to me even the backward slope and flexibility of these wings support my view.

If tails of the size of those of a pigeon and blackbird are necessary to their respective owners on land, would such an apology for one as that possessed by a gull be of any use during a severe storm?

No doubt Mr. Elliott will acknowledge having seen gulls execute sharp turning movements without spreading their tails, which shows that they use some other directing force besides the tail (if they do use the tail), though not, of necessity, that the tail cannot be used.

I, on my part, will own to having seen the tail of a gull spreading out when it alters its altitude, but I think the reason for this is that when altering its angle of incidence (as in gliding to earth) the rush of air strikes the tail from above or below, spreading it out.

This last case is a question of cause or effect, and as the actions take place almost simultaneously it is difficult, if not impossible, to distinguish which is the prior event.

If the tail spreads first, then it *does* make use of this member. If otherwise, the tail must be out of control and rudimentary. Even in the first case it is still very probable that the wings are used as an auxiliary control.

Chelmsford. H. BEST.

Trade Interests and the Club Committee.

[1117] Will you allow me, as a British designer, builder, and certificated pilot, to bring to the notice of your readers, and especially my fellow-members of the Royal Aero Club, a matter which has arisen in connection with the nominations for the new R.Ae.C. Committee members, soon to be elected? I notice that several gentlemen, prominently identified with trade interests, have been nominated. These gentlemen have proved themselves worthy and able to assist in the advance of aviation in this country, but I do not think that it is in the best interests of either the industry or the R.Ae.C. for trade members to sit on the Committee. They may be disinterested and public-spirited to the highest degree, but I think that the Committee should be, like Caesar's wife, above suspicion, and composed of men who, at least, have no obvious axes to grind. I may add that I have been asked to accept nomination, and, though I should greatly esteem the honour, I have refused for the above reasons.

"PRO BONO PUBLICO."

[There is, of course, much to be said for our correspondent's contention, particularly in these very early days of the industry. On the other hand, there is a great deal to be said in favour of adequate trade representation on the general committee (as distinct from other special committees from a few of which trade interests should obviously be excluded), as has been proved in the case of the Royal Automobile Club.—ED.]

Pendulum Stability.

[1118] In answer to Mr. Thompson (letter 1079) the machines to which I referred have the weight suspended *rigidly* from the planes, and I did not know that the Planes, Limited, machine had the weight flexibly suspended.

This is certainly a new feature on a power-driven machine, although the Chanute biplane glider had all the weight flexibly suspended from beneath the bottom plane as long ago as 1892; but it cannot be very effective, to judge by the way in which the Planes, Limited, machine was smashed up a short time ago.

The fact that a machine has flown without being controlled does not prove that it is easy to handle, for the Farman machine, which is easier to control than any other machine, has no natural stability.

Finally, if all stable machines have a low centre of gravity would Mr. Thompson tell me how the Wright machine can turn corners in the way shown on page 184 of FLIGHT for March 4th, 1911? It is true that this is a "circus feat," but could the Planes, Limited, machine or any other machine do the same?

Croydon. R. H. BUCKWELL.

The £10,000 Prize.

[1119] I have seen Mr. E. V. Hammond's letter (974) with reference to the *Daily Mail* prize of £10,000, and I think too, that a certain amount of handicapping and certain conditions should be enforced. I take the following extract from the conditions under which the prize is to be competed for:—"The winner will be the competitor who, starting from a fixed point near London, completes the prescribed circuit in the shortest time." These conditions bar a great number of men and machines, who could and would be willing to enter for the event but lack the capital to enter into competition with the big firms and combines, who will run their special trains, cross-country motor trips, with relays of petrol, spare parts and the usual impedimenta, convoyed by an army of mechanics.

Since this prize was offered the science of aeronautics has advanced rapidly, more especially with the general design of the machine and efficient engines, but one only has to look at the records to see which way the prize will "go" both as regards speed and duration, and it will be distinctly a monoplane year.

Now, where do the men come in who have done such pioneer work for the new art, whose machines are biplanes and triplanes? The machines are reliable enough, but the edict of the prize, as regards speed, out-classes them entirely if they want to use their own machines.

Patiala, Punjab. C. W. BOWLES.

Gyroscopic Control.

[1120] With regard to Mr. D. Greig's letter (1092) on "Gyroscopic Control," I cannot see the object of the gyroscope when a small weighted pendulum would appear to me to effect the same result. And instead of the electrical contacts, I would suggest a form of pendulum as being easily adapted for directly controlling any lateral or longitudinal inclination. To make myself clear, as soon as the aeroplane tilts, the aileron on the low side, being connected to the top end of the weighted pendulum lever, would be pulled down until the aeroplane resumed a horizontal position. In the same manner the elevator could be made subject to the same control in longitudinal inclination. I can see no reason why this method to stabilify aeroplanes automatically has not been adopted, as the weight required would be comparatively small and the mechanism extremely simple. Perhaps some of your correspondents can give me a reason for its impracticability. C. LANGLEY JOHNSON.

Flight and Esperanto.

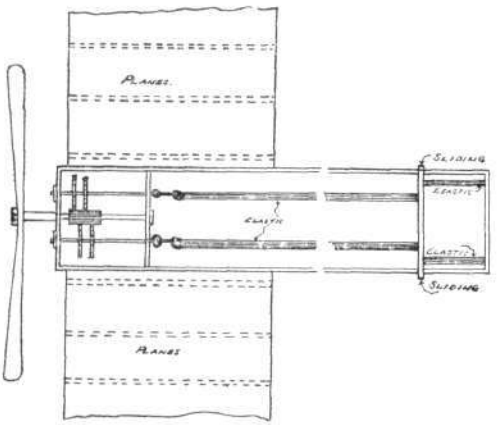
[1121] I was very pleased to notice Mr. Allsop's "Plea for Esperanto" in a recent issue of FLIGHT. Having used this language for international correspondence for upwards of five years, during which I have received more than 4,000 and despatched about 5,300 letters in Esperanto, I can endorse every word as to the utility and facility of this marvellous medium. May I add that I find your pages of the most absorbing interest week after week.

GEORGE DOUGLAS BUCHANAN.

MODELS.

Elastic Motor.

[1122] I have pleasure in sending you a drawing of an elastic motor. The working of it is as follows:—Turn the propeller and you will see the slide, which I have shown in

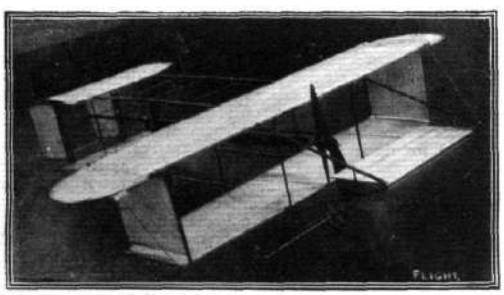


the drawing, tend to move toward the propeller, the elastic on the other side of the slide will stretch; when the propeller is loosed you will find it will keep up longer and go faster.

Birmingham. H. W. ALLEN.

Model Biplane.

[1123] Enclosed are photo and particulars of a model biplane, constructed by myself. The weight of machine complete is 19 ozs.; rubber motor, 30 strands of flat rubber, takes 100 turns to wind up, runs out in 5 seconds. On windy days I get some good results. Starting from the ground with a slight push it has flown to the height of 3 ft., then glided down, covering a distance of 100 ft. On one occasion it rose to the height of 9 ft. in a distance of 10 ft., and was then blown backwards over our heads. The frame is made of satin walnut, which I ripped down to required



size. The covering for the planes is Japanese silk and the total area 6½ sq. ft. or 892 sq. ins. The stretcher piece between the bearing and hook at the tail end, which runs through the frame, is tied diagonally with cord, which stops it from buckling. The rudders and elevator are operated by levers at the back of main planes. I got this model from a *Daily Mirror* picture. I did not then know of your valuable paper, which I now take in regularly, and which would have saved me a great deal of time and labour.

I shall be pleased to give further particulars to any interested reader.

Old Kent Road. W. C. NEAL.

NEW COMPANY REGISTERED.

Isaacson Radial Engine Co., Ltd., Boyne Engine Works, Leeds.—Capital £1,500, in £1 shares. Mechanical, electrical, and automobile engineers, manufacturers of maritime engines and aeromotors, aeroplanes, hydroplanes, &c.; acquiring the business carried on by J. S. Charlesworth, R. J. Isaacson, H. St. J. Sanderson, and H. Sanderson at Hunslet, Leeds, as the Isaacson Engine Co.

PUBLICATIONS RECEIVED.

The Principles of Aeroplane Construction. By Rankin Kennedy, C.E. London: J. and A. Churchill, 7, Great Marlborough Street, W. Price 5*s.* net.

Elementary Aeronautics. By A. P. Thurston. London: Whittaker and Co. Price 3*s.* 6*d.* net.

The Aviation World Who's Who and Industrial Directory. London: Aviation World Publishing Co., 12, Newgate Street, E.C. Price 2*s.* 6*d.* net.

Catalogues.

"*Valkyrie*" *Aeroplanes and Parts.* The Aeronautical Syndicate, Ltd., Collindale Avenue, West Hendon, N.W.

Flight Fittings, 1911. T. W. K. Clarke and Co., Crown Works, High Street, Kingston-on-Thames.

Aeronautical Patents Published.

Applied for in 1909.

Published March 23rd, 1911.

24,381. W. PARIS. Aeroplanes and other flying machines.

Applied for in 1910.

Published March 23rd, 1911.

1,071. G. DEAN. Flying machines.
5,473. T. C. MURPHY AND J. M. BETT. Propulsion of aeroplanes.
5,703. R. L. MATTESON. Flying-machines.
6,150. N. F. USBORNE. Dirigible airships.
10,952. J. G. RAMEL. Automatic device for actuating stabilising planes and rudders.
24,401. J. VON KORWIN. I.C. engines for aerial machines.

DIARY OF COMING EVENTS.

British General Events.

Mar. 24–April 1 Olympia Aero Show.
July 1 .. Gordon-Bennett Aviation Cup Contest.
July 22–Aug. 5 *Daily Mail* Round England Contest.
Oct. 31 .. Close of British Michelin Cup.

Foreign Fixtures.

April 9–21 .. German Circuit—Ulm, Frankfort, Friburg, Strasburg, Carlsruhe, Mannheim, Wiesbaden (1016).
April 16 .. Dresden Meeting.

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